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Printing Committee To Open Bids May 17

Ask For Approximately 36,915,000 Pounds of A Wide Variety of Paper For the Six Months Period Beginning July 1, 1937 — All Contracts Must Conform To Walsh-Healey Government Contract Act — Awards May 24.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., April 14, 1937 — The Joint Congressional Committee on Printing met yesterday and approved a schedule of paper and envelopes for the use of the Government Printing Office, bids to be opened on May 17 and awards to be made one week later.

Paper bids will be received for a six months period beginning July 1 next and envelope bids for a year beginning the same date. The quantity of paper to be used in the six months period is estimated at 36,915,000 pounds compared with 36,943,000 pounds for which bids were opened the last of November. It is estimated that 47,527,000 envelopes will be used for the annual supply compared with 47,673,000 for the present contract year.

The Paper Specifications Committee in drawing up its report announced that it had eliminated the ash requirements for all book papers and in the manila papers the specifications were broadened so that new fibers can be used.

Report of the Committee

The contracts must all conform to the Walsh-Healey government contract act as they did at the last opening. Following is the report made to the Joint Committee by the Paper Specifications Committee:

The Committee on Paper Specifications respectfully submits its Thirty-third Report and the accompanying recommended schedule for paper for the public printing and binding and blank paper for the use of the Government departments and establishments in the District of Columbia for the term of six months, beginning July 1, 1937.

The thickness tolerance of plus or minus .0005 inch has been changed to permit a greater tolerance for the heavier papers and boards to conform with commercial practice. Paragraph 24 of the General Requirements on "Thickness" has been modified accordingly.

The ash requirements for all book papers, lots 3 to 40 inclusive, have been eliminated because, in view of new developments in the use of fillers, it is felt that these requirements are no longer needed.

Further research in measuring the printing quality of paper delivered to the Government Printing Office demonstrated the necessity of modifying the oil penetration and smoothness requirements of several of the book-paper items. Smoothness requirements have been added to the coated book papers in order to obtain a more uniform finish.

The designations of 50 per cent Rag Machine-Finish Book and 100 per cent Rag Machine-Finish Book for lots 20 to 22 inclusive and lots 24 and 25 were changed to 50 per cent Rag Antique Book and 100 per cent Rag Antique Book, respectively, in order to more adequately define the desired finish.

Requirements for 120-pound half-tone book paper were added to lot No. 34 to meet the demands of the executive departments.

Papers described in lots 18, 19, 20 to 22, 66, and 67, and 120 to 123 inclusive, in addition to those specified in the preceding schedule are required to be delivered on skids instead of in cases.

Lots 33, 101, 103, 104, 153, 185, 186, and 187 have been eliminated from the schedule as they are no longer needed.

The laid design requirements of 50 per cent Rag Laid Cover Paper, lot 205, has been changed to specify a machine-laid design.

In view of difficulties in obtaining manila papers made from rope stock and due to development of new fibers equal in quality to that of rope, the stock requirements for lots 213 and 214, 215, and 280 were broadened to permit the use of these new fibers.

The desired colors of blotting papers, lots 254 and 255, 256 and 257, 255 and 259 have been better defined by specifying that they conform to standard samples rather than to manufacturer's stock shades.

The bursting strength and thickness requirements of Oiled Manila Tympan paper, lot 262, have been modified to obtain paper of better quality.

This schedule embraces 169 lots, being 8 less than the number in the preceding schedule. The quantity estimated for the term of six months beginning January 1, 1937, is approximately 36,915,000 pounds, as compared with 36,943,000 pounds for the previous contract period of six months.

Estimated Quantities of Paper Needed

The approximate estimated quantities of paper to be needed include the following:

1,000,000 pounds of newsprint paper.

(Continued on page 39)

World Production of Newsprint Paper in 1936

Reaches An All Time High With 8,217,000 Short Tons Which Is 8 Per Cent Higher Than In 1935 — Canada Made 39, Great Britain 12, and the United States 11 Per Cent of the Total—Canada Passes Three Million Mark.

World newsprint production reached an all-time high to date in 1936 with 8,217,000 short tons. This was 589,000 tons or about 8 per cent greater than in 1935 when 7,628,000 tons was manufactured, and 875,000 tons or some 11 per cent higher than in 1934 when 7,342,000 tons was produced. Prior to these years, 1929 held the record with an output of 7,319,000 tons. Yearly figures from 1927 to 1936 for all countries are shown in the accompanying table which is based upon data received direct by the News Print Service Bureau, information from foreign correspondents and reports to the Department of Commerce in Washington.

Canada Made 39 Per Cent of World Output

Canada made 39 per cent of the world production of newsprint last year, Great Britain 12 per cent and the United States 11 per cent. Germany furnished 6 per cent, Finland and Japan each 5 per cent, France and Newfoundland each 4 per cent, Sweden and Russia each 3 per cent with lesser amounts from other countries.

For the first time in history, Canada's production passed the three million ton figure, the Dominion manufacturing 3,192,000 tons of newsprint in 1936, which was 439,000 tons more than the output in 1935 and 539,000 tons more than in 1934.

Great Britain Produced One Million Tons

Another first was attained by Great Britain when her production went beyond one million tons of newsprint last year. This exceeded by 34,000 tons her output in 1935 and by 64,000 tons that in 1934.

U. S. Output Higher

The United States production of 921,000 tons, while 9,000 tons higher than the output in 1935, was 36,000 tons less than in 1934 and over three-quarter million tons—763,000—less than in 1926 when United States production reached its peak of 1,684,000 tons.

Germany retained fourth place, manufacturing 525,000 tons of newsprint last year, which was 61,000 tons more than in 1935, but still about 100,000 tons less than her previous high mark of 623,000 tons in 1929.

Finland, by producing 402,000 tons of newsprint in 1936, climbed to fifth place in world production, passing Japan, France and Newfoundland. Finland has maintained an unbroken record of increase in production over the ten years covered in the tabulation.

Japan showed an increase over 1935 of 16,000 tons with a production of 384,000 tons of newsprint paper.

French newsprint output dropped slightly during 1936 with a total of 331,000 tons. This was 27,000 tons less than in 1935, the previous peak year. Newfoundland also produced slightly less than in 1935—the high mark—with 328,000 tons manufactured in 1936, which was 8,000 tons below the 1935 figure. This was due to an accident at one mill which slowed down production for a time. Sweden, too, had a smaller output for 1936 with 282,000 tons. This was 16,000 tons less than the 1935 figure of 298,000 tons when Sweden made her high record. Russia held tenth place with a production of 217,000 tons, an increase of 24,000 tons over 1935. Norway followed Russia in rank with a total of 200,000 tons, a gain of 18,000 tons over 1935.

Austria, Belgium and Czechoslovakia showed slight increases over 1935 production figures, while The Netherlands, Italy, Switzerland, Poland and Spain lost ground in 1936. No reports were received from Spain, struck by Civil War. The estimate of 18,000 tons of newsprint made in 1936, compares with 42,000 tons in both 1935 and 1934. Mexico, because of domestic difficulties, had no production of newsprint paper during 1936. Chile, Latvia and Estonia had slight increases over 1935, while Denmark produced no newsprint last year.

Nashua to Build Plant Addition

The Nashua Gummed and Coated Paper Company of Nashua, N. H., has filed with SEC a registration statement covering 9,500 shares of no par common stock, of which 3,000 shares are outstanding.

Proceeds received from the sale of 6,500 shares will be used for plant additions in Nashua. This company owns the Package Paper Company of Holyoke.

WORLD PRODUCTION OF NEWSPRINT PAPER 1927—1936
(Thousand Short Tons)

Country	1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	10-Year Average	Country
Canada	3,192	2,753	2,599	2,017	1,914	2,221	2,504	2,729	2,381	2,087	2,440	Canada
Great Britain	1,004	970	940	830	790	719	608	637	646	615	776	Great Britain
United States	921	912	957	946	1,009	1,157	1,282	1,392	1,418	1,486	1,148	United States
Germany	525	464	446	412	450	540	590	623	600	565	522	Germany
Finland	402	329	316	285	254	241	223	217	214	200	268	Finland
Japan	384	368	344	304	272	258	285	286	267	246	301	Japan
France	331	358	353	335	275	243	240	210	136	121	260	France
Newfoundland	328	336	316	271	272	295	287	256	231	203	280	Newfoundland
Sweden	282	298	272	266	257	265	240	275	234	239	263	Sweden
Russia	217	193	190	135(?)	125(?)	100(?)	90(?)	48(?)	7(?)	10(?)	112(?)	Russia
Norway	200	182	155	167	200	104	202	189	198	192	179	Norway
Netherlands	91	92	92	87	85	79	84	77	76	77	84	Netherlands
Italy	69	76	68	72	74	69	69	52	45	42	64	Italy
Austria	57	50	50	50	53	62	64	63	57	50	56	Austria
Belgium	53	48	51	39	40	44	50	57	50	50	48	Belgium
Czechoslovakia	46	41	37	38	40	42	44	47	45	45	43	Czechoslovakia
Switzerland	44	45	39	45(?)	45	49	47	48	40	40(?)	44	Switzerland
Poland	32	34	32	23	23	27	27	23	20	17	26	Poland
Spain	18(?)	42	42	65(?)	65	62	32	30	26	25	41	Spain
Chile	7	6	6	...	...	...	...	...	...	...	2	Chile
Latvia	7	6	5	5	5	3	4	4	3	3	5	Latvia
Estonia	7	4	6	6	6	17	29	27	20	21	14	Estonia
Mexico	...	20	20	16	13	15	14	19	17	14	15	Mexico
Denmark	...	1	6	7	9	10	10	11	16	16	9	Denmark
Total	8,217	7,628	7,342	6,421	6,276	6,622	7,025	7,319	6,747	6,364	6,996	Total

Fox River Valley Paper Mills Increase Wages

Gilbert Paper Co. Grants Advance of Eight Cents Per Hour to All Three Hundred Mill Employees—Each Worker Receive Week's Vacation With Pay —Bergstrom Paper Co., of Neenah, Also Advances Hourly Rate Schedule.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., April 12, 1937—Two more of the paper mills of the Fox River Valley last week announced wage increases. Gilbert Paper Company, Menasha, Wis., put a new schedule into effect April 5, which gives an increase of eight cents an hour to all mill employees. Bergstrom Paper Company, Neenah, Wis., also granted workers an increase of eight cents an hour.

Overtime rates at the Gilbert mill have been increased from time and a third to time and a half. Each employee is to receive a week's vacation with pay, on a 40-hour week basis. The vacation is to be given the week of July 4. Approximately 300 Gilbert workers benefit from the new policy.

Northwood Chemical Co. Formed

Organization of the Northwood Chemical Company at Phelps, Wis., in the northern part of the state close to the timber region, was announced last week by E. T. Olson, of Marquette, Mich. The company is arranging to purchase the C. M. Christiansen and Company plant at Phelps as the nucleus of its proposed operations. Special charcoals and pulverized soft and hardwood fiber for the plastic industry will be produced, according to Mr. Olson, who is president of the new company. Plans include the erection of a fiber plant, a laboratory and an office building. About 125 employees will be required for the new industry.

New Unit for Neenah Foundry

Construction has been started by the Neenah Foundry Company, Neenah, Wis., on a new plant unit 28 by 50 feet adjacent to its present buildings. The structure will house a welding and repair shop to serve the paper mills and allied industries of that section. Anton Nielsen of Neenah, has the contract.

Installs New Vacuum Washer

As a part of its modernization program, the Interlake Pulp and Paper Company division of the Consolidated Water Power and Paper Company at Appleton, Wis., is installing a vacuum washer manufactured by the Improved Paper Machinery Corporation, Nashua, N. H. The equipment will replace obsolete machinery, and will serve to save stock and decrease river pollution. It was necessary to raise the washer 40 feet above the ground to place it in the mill, and this was accomplished by erecting piling beneath as it was hoisted bit by bit. A crew of the George W. Kennedy Company, Green Bay, Wis., worked for eight days to elevate the 26-ton apparatus to the point where it can be moved in. The work is being done under the supervision of George Marcean, construction superintendent, and Ellef Ellefson, master mechanic at the mill.

Little Wagner Act Passes

Wisconsin's "Little Wagner Act," placing a powerful legal weapon in the hands of organized labor for collective bargaining, passed the Assembly last week by a vote of 77 to 19, with all amendments proposed by the paper industry and others defeated. The bill had previously passed the Senate after a 12-hour fight to balance its provisions with some rights for the protection of employers. There was little doubt that Governor Philip F. La Follette would sign the bill when it reaches him this week, because it bore his approval and that of the Wisconsin Federation of Labor. The bill creates a three-man labor commission to handle all labor disputes, appointed by the governor and confirmed by the Senate.

Amendments defeated include: Requiring incorporation of labor unions; forbidding the calling of any strike until the dispute is submitted to and acted upon by the labor board; declaring illegal the taking of unauthorized possession of any property (sitdown strikes); requiring labor organizations to render financial accounting to their members and to be licensed by the labor board, and exempting railway brotherhoods which come under the national railway labor act.

Tomahawk Litigation Settled

Litigation growing out of the purchase of the Tomahawk Pulp and Paper Company, Tomahawk, Wis., has been settled by Judge A. H. Reid in the circuit court at Merrill, Wis., through allowance of a bill of expenses submitted by defendants in the action.

The property of the defunct mill was purchased at a federal bankruptcy sale by a syndicate composed of Paul J. Schrader, Harry Harris and Samuel Winternitz, all of Chicago, for $35,000. Messrs. Harris and Winternitz sought to break the contract of the syndicate, but Judge Reid upheld the contract in an action brought by Schrader.

Folke Becker, president and general manager of the Rhinelander Paper Company, was appointed a receiver and disposed of the assets of the company for approximately $50,000. Mr. Schrader did his utmost to find an operator for the mill before the machinery and equipment were liquidated by the receiver.

Under the contract Messrs. Schrader, Harris and Winternitz will each receive one-third of the profits of the sale of the property after the expenses and cost of the receivership are paid. The expenses allowed by Judge Reid to Harris and Winternitz were $2,699.

Dr. Lewis to Discuss Papermaking

Dr. Harry F. Lewis, dean of the Institute of Paper Chemistry, Appleton, Wis., left last week for Chapel Hill, N. C., to attend the spring meetings of the American Chemical Society at the University of North Carolina. He speaks April 23 on "Problems of Papermaking" at a meeting of the Chicago section of the American Chemical Society, with a membership of approximately 1,000.

Columbia Alkali to Build Lab.

The Columbia Alkali Corporation, Barberton, Ohio, manufacturer of soda ash, caustic soda, and allied chemical products, has approved plans for new two-story and basement, brick and steel addition to local plant, to be equipper primarily for laboratory service, with portion reserved for office purposes. It is estimated to cost close to $100,000, with equipment. General erection contract has been awarded to the Gillmore-Carmichael-Olson Company, 1873 East Fifth-fifth Street, Cleveland, Ohio, and work will be placed under way at once.

Ontario Paper Co.'s New Plant Progressing

Newsprint Paper Mill and Power Plant At Comeau Bay On Lower St. Lawrence Being Constructed Rapidly—Application Made To Quebec Legislature For Creation of Model Town Built for Workers Into Municipality

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., April 12, 1937 — Excellent progress is being made on the 100,000-ton newsprint mill and power plant which is being constructed at Comeau Bay, on the Lower St. Lawrence by the Ontario Paper Company, a subsidiary of the *Chicago Tribune* and its affiliated paper, the *New York Daily News*. The company has built at the plant a model town for the workers, and during the past week it made application to the Quebec Legislature for the creation of a municipality. This gave rise in the Private Bills Committee to a long discussion on the principle of company-owned towns.

Control of municipalities by companies had given rise to numerous abuses in the past, said several members of the committee, and while they did not doubt good faith of the company, they wished to prevent similar abuses. It was brought out the company would remain sole property owner in the municipality until employees had finished paying for their homes, though employees, as electors, would be able to elect aldermen and a mayor and decide such matters as width of the streets, building restrictions, etc.

The Hon. T. J. Coonan, Minister without Portfolio, suggested the company had no right to seek incorporation of a municipality, but a group of property owners should have made the petition. To that end he suggested the company sell lots to a number of employees and let them seek incorporation. The company representatives argued the municipality should be incorporated immediately, and foresaw abuses in juggling of ownership of city lots.

Finally the matter was adjourned, and it was expected the difficulties would be ironed out when the Committee meets later on.

Bathurst Power & Paper Report

The Bathurst Power and Paper Company has forwarded its annual report of operations for 1936 to its shareholders. The report shows gross or manufacturing profit at $258,929, against $248,794 for 1935. Net earnings for the year under review totalled $269,241, against $327,977 for 1935. This does not give a true picture of the situation, as the company carried out expensive improvements and renovations during the year that will add considerably to its earning power. More significant of the company's present position is the indication from an official source that in the first two months of 1937, after provision for depreciation and depletion, the company showed a net profit as against a loss for the first two months of 1936.

Sales for 1936 totalled $2,069,072, against $1,817,670 for 1935, while cost of sales at $1,810,143 compared with $1,568,876, leaving gross profit at $258,929, against $248,794, as above referred to.

The report of the directors points out that while the results for the year, 1936, are disappointing, mainly because of conditions over which the company had no control, conditions in the industry are showing a marked improvement and the board believes that the outlook for 1937 is encouraging. It notes that during the past year the company embarked on an important expansion and replacement programme, which has naturally affected the working capital position, but from which programme no earnings' benefits were available in the period covered by the current report.

From the net earnings for the year at $269,241, there was deducted depreciation at $176,090; idle expenses at $31,435; loss by Bathurst Power at $3,971; tax provision at $12,405, and with addition of adjustment at $2,031, there remained a net profit for 1936 at $47,371, against $94,534 for 1935. Previous surplus was brought forward at $22,489, leaving a surplus to be carried forward of $69,860.

Reflecting the program above referred to, net working capital is shown moderately lower at $2,179,585, as against $2,434,374 at the end of the preceding year.

L. R. Lindley Dead

[FROM OUR REGULAR CORRESPONDENT]

MARION, Ind., April 12, 1937—Lee R. Lindley, wealthy Marion paper box manufacturer died recently at a Philadelphia hospital. He was 63 years old.

Mr. Lindley's career was a spectacular ascent from office boy to head of an industry. Born in Greenville, Ohio, he became office boy in an Anderson paper box factory and speedily acquired a knowledge of the industry which brought his appointment as general manager.

He went to Cleveland, Ohio, as manager of a factory in 1906, started his own jobbing business at that time and, a year later, established his own manufacturing company in Louisville, Ky.

In 1909 he purchased the Pittsburgh Paper Box Company at Gas City, near here, consolidated it with his own company, and moved the entire industry to Marion in 1916 under the name of the Lindley Paper Box Company.

He was a director of the First National Bank here. Mr. Lindley, friends said, carried $1,000,000 life insurance, and had increased his wealth sharply by selling out all his stock market holdings shortly before the 1929 crash.

Surviving are a daughter, Mrs. Monaei Lindley Grozs, wife of a New York broker and a former motion picture actress; a son, Floyd Lindley of Marion; a brother, H. H. Lindley, vice-president of the Lindley company here, and two sisters.

John J. Ditgen Dead

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, April 12, 1937 — John J. Ditgen, president of the Ditgen Paper Company, 641 Main street, Cincinnati, died last Wednesday at his residence, 3244 Burnett avenue, following a brief illness. He had been in the paper business for a number of years and was active in lodge and civic circles.

Besides his widow, Caroline Conrad Ditgen, he is survived by a daughter, Mrs. Clara Oberschmidt, and a son, John M. Ditgen.

Funeral services were conducted Friday at 3 P. M., at the Thomas Funeral Home, 4418 Whetsel Avenue, Madinsonville.

Volume of Paper Sales Maintained In Boston

New and Higher Prices on Book Papers Become Effective — Wrapping Paper and Kraft Specialties Move In Favorable Amounts — Demand for All Kinds of Paper Stock Persistent—New Domestic Rags Generally Steady.

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., April 12, 1937 — The volume of paper sales was generally well maintained in this market last week. New and higher prices on book papers went into effect Wednesday. Manufacturers are asking prices on some lines of papers which are prevailing at time of shipment. Wrapping papers and kraft specialties moved in favorable amounts. The demand for box boards was sustained.

In paper stock, some material was active, while for others there was not so much demand as there had been. All kinds of old papers were reported to be in demand, with white blank news more called for than previously. The price of white blank news advanced to 1.30 @ 1.40 from 1.25 @ 1.30, f.o.b., Boston, with manila envelope cuttings, extra quality going up to 2.20 @ 2.30 from 2.15 @ 2.25 and No. 1 kraft being quoted at a flat price of 2.00, compared with a range of 1.90 @ 2.00, both f.o.b., Boston.

The bagging situation is not so acute as it was because of the automobile strike. Some of the buyers are not in the market now for bagging to be used for padding in cars, so the situation has eased to a considerable extent. Prices, however, advanced in a number of grades.

Foreign manila went up to 5.00 @ 5.25 from 4.50 @ 4.90, soft jute strings to 2.75 @ 3.00 from 2.50 @ 2.62½, foreign scrap burlap to 2.25 @ 2.35 from 2.15, scrap sisal to 2.60 @ 2.75 from 2.50 @ 2.60, scrap sisal for shredding to 2.75 @ 3.00, and heavy wool tares to 2.40 @ 2.60 from 2.25 @ 2.40, all f.o.b., Boston. It is predicted that there will be greater demand after the labor difficulties are settled.

New domestic rags were generally steady. Among the grades in demand were new light flannellettes at .07½, f.o.b., Boston. In old domestic rags, roofing stock was easier, the No. 1 grade declining to 1.60 @ 1.70 from 1.70 @ 1.80, No. 2 to 1.50 @ 1.60, and No. 3 to 1.25 @ 1.30 from 1.30 @ 1.35, all f.o.b., Boston. Under foreign rags, the demand for dark cottons was easier. The price went down to 2.00 @ 2.10 from 2.10 @ 2.20.

Conditions in the twine market were reported as "very gratifying," although difficulty in deliveries was an important factor in the situation.

Ireland & Taub Changes

Ireland & Taub Paper Company, Inc., have closed the Boston office, as of April 1. Joseph Kinniery, who was a salesman for this concern, is now with Knight, Allen & Clark, Inc.

Carter, Rice & Co's Displays

Carter, Rice & Co., Corp., have received their quota of 1937 Strathmore Wedding Paper Displays, which are made up in an extremely elaborate and decorative style, reflecting the coronation influence. The displays depart from previous years in having a white background and a gold embossed frame for the photograph. As in past years, there are three pieces, a center-piece (made in a size which is practical for both window and counter use) and two side-cards. This year the side-cards have gold borders and a light gray background, which tones in with the middle grays in the photograph and so forms a good background for the specimens displayed.

Paper From Wells

Percy D. Wells, 58 Pearl street, has issued, as of April 8, 1937, a new handy combined pocket stock and price list, headed "Paper from Wells," with an illustration of the well, from which paper is being drawn by means of an old-fashioned well sweep. Mr. Wells notes on the paper that all prices and quantities are subject to change without notice. The list includes Franconia Bond, Allied lines and others. Allied dependable papers in the list are stocked in a New York warehouse with over-night deliveries available. The list is printed on 70 pound India Montgomery Offset.

Percy Wyman With Dowd Co.

Percy Wyman is now with H. J. Dowd Company, Inc., Cambridge, Mass., as director of sales in the twine department. Mr. Wyman was previously with the Stone & Forsyth Company in the same capacity and had held an executive position with it for the last 20 years. He is very highly regarded as an expert authority on twine.

Wheelwright Papers Discussed

A sales meeting was held at the office of Knight, Allen & Clark, Inc., Saturday morning, when Mr. Trefry of the Meade Company and Wheelwright Papers, Inc., gave a talk of the Wheelwright papers. Walter Temple, sales manager, presided.

Leon M. Poore Visits South

Leon M. Poore, treasurer and general manager of John Carter & Co., Inc., has gone on a short vacation, cruising in Southern waters.

New England TAPPI Discusses National Legislation Affecting Mill Management

The New England Section of the Technical Association of the Pulp and Paper Industry will meet at the Holyoke Hotel, Holyoke, Mass., on Friday, April 16, 1937, at 6:30 for dinner after which the regular monthly meeting will be held.

Albert E. Sawyer, of the Dennison Manufacturing Company, Framingham, Mass., will speak on "National Legislation Affecting Mill Management." Mr. Sawyer is in general charge of the legal phases of the various state and federal laws regarding fair trade practice and is in a position to speak authoritatively on this subject. Mr. Sawyer is a graduate of both the School of Business Administration and the Law School of the University of Michigan and was legal assistant to George Wickersham when he was associated with the Wickersham Commission.

Mr. Sawyer will present a brief analysis of the trend of governmental intervention in business management as it relates to working conditions and to selling practice.

All are welcome.

Paper Mill Earnings Show Industry's Strength

Country-wide Business Improvement Benefits Local Paper Market — Fine Paper Manufacturers Running Far Behind Orders — Kraft Paper Buoyant With Demand Well Sustained — Ground Wood Papers Show Betterment.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., April 12, 1937—Reports of earnings circulated in Chicago's financial center indicate that the paper industry is making good use of the nation-wide improvement in business. Included in the headlines of the week was the report that Container Corporation of America was advancing container prices from 15 to 35 per cent effective the first of the week. The higher quotations are being applied to April shipments only with May and June business being booked at open price. Other paperboard products have also shown a marked upward trend.

Kraft papers continued their strong position locally with demand running full. Fine papers in general were reporting mills running far behind in orders while coated stock jobbers in the city are asking for from a month to two months to insure deliveries locally. Groundwood markets locally were also reported strong.

Waste papers were reported as currently more active with the higher grades showing the most signs of the marked increase in demand for raw materials.

Hammermill Motion Picture Shown

The Chicago Direct Mail Advertising Club utilized its March meeting to present G. C. Olson, advertising manager of the Chicago Paper Company who spoke at the "Paper Day Program" on March 17. Following Mr. Olson's remarks, a three-reel motion picture showing the manufacture and merchandising of paper was shown by a representative of the Hammermill Paper Company. Mr. Olson discussed eight problems confronting the buyer of drawings and cuts advising them they could eliminate these problems by consulting well informed lithographers or printers before they made any commitments. The discussion was invaluable in presenting the interests of the paper industry to the ultimate users of the product.

New Hinde & Dauch Issue

The offering of 36,000 shares of $5 convertible preferred stock of Hinde & Dauch Paper Company has been underwritten by a local group headed by Glore-Forgan & Co. and Maynard H. Murch & Co. The offering will not be opened to public subscription, all of the stock having been sold. Holders of the company's $6 preferred stock, which is being retired, were given the privilege of exchanging their shares for shares of the new $5 preferred. The new preferred is convertible into common at the rate of 2½ shares for each share of preferred until April 1, 1939, through April, 1941.

Western Paper Merchants Activities

The Western Paper Merchants Association, 20 North Wacker Drive, Chicago, has announced that the subject of "Paper Merchants' Salesmen" is to be considered at the April meeting of the association. George A. Mueller, president of the association, expects a great deal of interest to be evidenced in this regular monthly meeting which follows a March 5 discussion on "How Much Does It Cost Paper Merchants To Do Business". N. V. Ventriss, secretary of the association, gave the main address on the subject and used illustrations to prove many interesting points. R. S. Bull, president of Bradner, Smith & Co., has been elected a director of the association to succeed E. A. Damhorst, of the Irwin Paper Company, resigned. The association will also soon make public its list of chairmen for the year including the various heads of the commodity groups. The committees plan to work closely with paper manufacturers in developing their specific programs with respect to each commodity.

Heads Iowa Paper Merchants

From the neighboring State of Iowa comes the news that A. D. Riley has been elected president of the Iowa Paper Merchants Association, the election taking place at the annual meeting held in Cedar Rapids last week. G. H. Thode was elected vice-president; R. B. Wixson, secretary and R. H. Jacobs, treasurer of the group. Reports on deliberations of the National Paper Trade Association were also a feature of the well attended sessions.

Paper Manufacturers Convene

Writing paper manufacturers and kraft paper manufacturers held meetings in Chicago during the week with the Drake Hotel the site of both sessions. Both meetings were exceptionally well attended, the discussions centering around market conditions and possible developments in the near future.

New Continental Carbon Offices

The Continental Carbon Company is now installed in its new modern offices in 295 Madison avenue, New York.

Located at Sunray, Texas, in the heart of the gas and oil district, Continental's new plant is one of the largest, and certainly one of the most up-to-date Carbon Black plants in the world.

With an ample reserve supply of gas from the acreage of the Continental Gas Company in Moore County, Texas, as well as a substantial part of the Shamrock Oil and Gas Company acreage in the same county, it is estimated that production will reach 3,000,000 pounds a day by the end of May.

Built on modern lines, equipped with the most up-to-date machinery available, its production methods and research laboratories under the supervision of an experienced staff, Continental enters the field at an opportune time, ideally prepared to meet the growing demands of industry.

New Cornell Iron Works Catalog

Cornell Iron Works, Inc., 36th Ave. and 13th street, Long Island City, New York, has just published a new twelve page general catalog entitled, "Modern Cornell Doors-Upward Acting." Cornell has been making fine upward acting Doors and Grilles since 1828.

The catalog describes and illustrates with details and photographs, the Cornell Upward Acting Doors and Grilles. Illustrated are Rolling Doors and Rolling Grilles in various metals, and wood and steel Float-Over, Canopy, Bifold, Vertical Lift and Turn Over Doors.

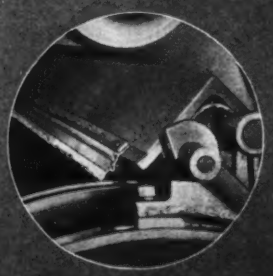
Actual installations are featured and unusual applications are shown. A copy is free for the asking.

APPLY THE "SPEED-UP" TO YOUR ROLLS

One mill gets an extra thousand pounds production per day after applying Vickery Doctors to their dryers . . . Another now gets as much production from two super-calenders with Vickery Doctors as they used to get from seven . . . *Every* Vickery Doctor user increases running time and cuts roll maintenance time and cost . . . They cost little but they do a big job. May we show you where you ought to have them?

BIRD MACHINE COMPANY • SOUTH WALPOLE • MASS.

Vickery Doctors



YOU CAN MAKE MORE MONEY WITH NEW BIRD MACHINERY

Ontario Pulp & Paper Makers Association Meet

W. N. Corbett, of Abitibi Power & Paper Co., and George Brown, of the Gair Co. of Canada, Elected Directors — Hinde & Dauch Co., Wins Class "A" Accident Trophy — Corrugated Box Co. Awarded Class "B" Trophy.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., April 12, 1937 — At the annual meeting of the Ontario Pulp and Paper Makers Association held recently in Toronto two new directors were appointed in the persons of George Brown, of the Gair Company of Canada, Ltd., and W. N. Corbett, of the Abitibi Power and Paper Company, Ltd., of Toronto, who take the place of B. F. Avery, of the Abitibi Company, Toronto, and John Ball, of the Beaver Wood Fibre Company, Thorold. The trophy in the Accident Prevention Competition in Class "A" was won by the Hinde & Dauch Paper Company of Canada, Toronto, with thirteen lost time accidents, representing 181 days and a severity rating of .191. The runner-up was the Smooth Rock Falls Division of the Abitibi Power and Paper Company, with a severity rating of .196.

In Class "B", the Corrugated Paper Box Company of Leaside, was the winner of the trophy with a perfect record of no accidents and no lost time. The Gair Company of Canada, Toronto, was the runner-up, ranking second in order of the number of hours of work.

In the First Aid Teams Contest the trophy went to Iroquois Falls Division of the Abitibi Company, with a score of 91.2 and the runner-up was the team from the Kenora Paper Mills, Kenora, with a score of 90.2. The winners receive not only the trophy but individual medals and cash donations. T. Norman Dean, statistician of the Workmen's Compensation Board, delivered an interesting address on "accident prevention," recounting its history and progress in legislative enactments. The annual report of D. B. Chant, secretary-engineer of the Ontario Pulp and Paper Makers Safety Association, was encouraging showing advancement all along the line. A group of employees from the Cornwall Division of the Howard Smith Paper Mills presented a Safety playlet which was well received. W. S. Barber, of Provincial Paper Toronto, was re-elected president of the Ontario Association for the coming year and George Barber, of the Spruce Falls Power and Paper Company, Kapuskasing, was re-elected vice-president.

Lake Sulphite Pulp Plans

The Lake Sulphite Pulp Company is planning action in connection with the erection of a two hundred ton, bleached sulphite mill which will be erected at the mouth of the Nipigon River. John Stadler, designer of the new plant, estimated manufacturing costs at $39.40 per ton at the mill and net earnings of $20 per ton available for depreciation, bond interest, taxes and dividends. At capacity of 60,000 tons per year, this would amount to $1,000,000. After depreciation and bond interest, but before taxes, this would reach some $5 per share on the common stock and would increase by $4 per share for every $10 increase in the price of sulphite pulp which is now selling around $60 per ton. Private offering is now being made of 150,000 no par common shares of the Lake Sulphite Pulp Company at $26.50 per share. In addition to the common stock $3,000,000 of five and a half per cent first mortgage, twenty year convertible bonds will be offered at a later date. The company will net $6,000,000 from the sale of these two classes of securities. .This will finance the construction of a 200 ton mill which will cost some $5,060,000 and the balance will be used for working capital. The plant is scheduled to begin operations early in 1938. Cutting rights have been granted by the Ontario government on approximately 2,300 square miles for a period of twenty-one years from April 1, 1937, renewable for another twenty-one years.

B. F. Avery Joins Great Lakes

B. F. Avery, assistant general manager of the woods department of the Abitibi Power and Paper Company, Ltd., Toronto, has been appointed woods manager of the Great Lakes Paper Company, Ltd., Fort William, Ont., and has entered upon his new duties. Previous to joining the Abitibi Company in 1928, he was for several years with the Spanish River Pulp and Paper Company, Ltd., at Espanola. Mr. Avery is succeeded at the Abitibi organization by C. B. Davis, manager of woods operations of the Iroquois Falls division of the firm.

Pulpwood Exports

The Hon. Peter Heenan, Minister of Lands and Forests, in regard to the export of pulpwood cut from Crown lands for Ontario, and the cordage during the past year, says that export licenses were granted to: Remus Brothers, Pigeon Timber Company, Ltd., Oscar Styffe, Ltd., Hammermill Paper Company, Newaygo Timber Company, Thomas Falls, D. A. Clark, C. W. Cox. Ltd., G. W. Jones, Armstrong Forest Company, J. A. Ward, and H. F. Baker. The cordage exported was 338,995, valued at $2,671,862. 118,254 cords were taken from Crown lands and 220,741 cords were taken elsewhere.

Asks for Hearing on Bedding Bill

The Esterline-Angus Company, Indianapolis, Ind., has Inc., is taking an active interest in legislation which has been introduced in Albany,, which would after July 1, 1938, prevent the use of second-hand material in articles of bedding or upholstery when such upholstery is for household furniture. A flock of Bills were introduced covering this subject but all of them have been withdrawn except what is known as Print 1784.

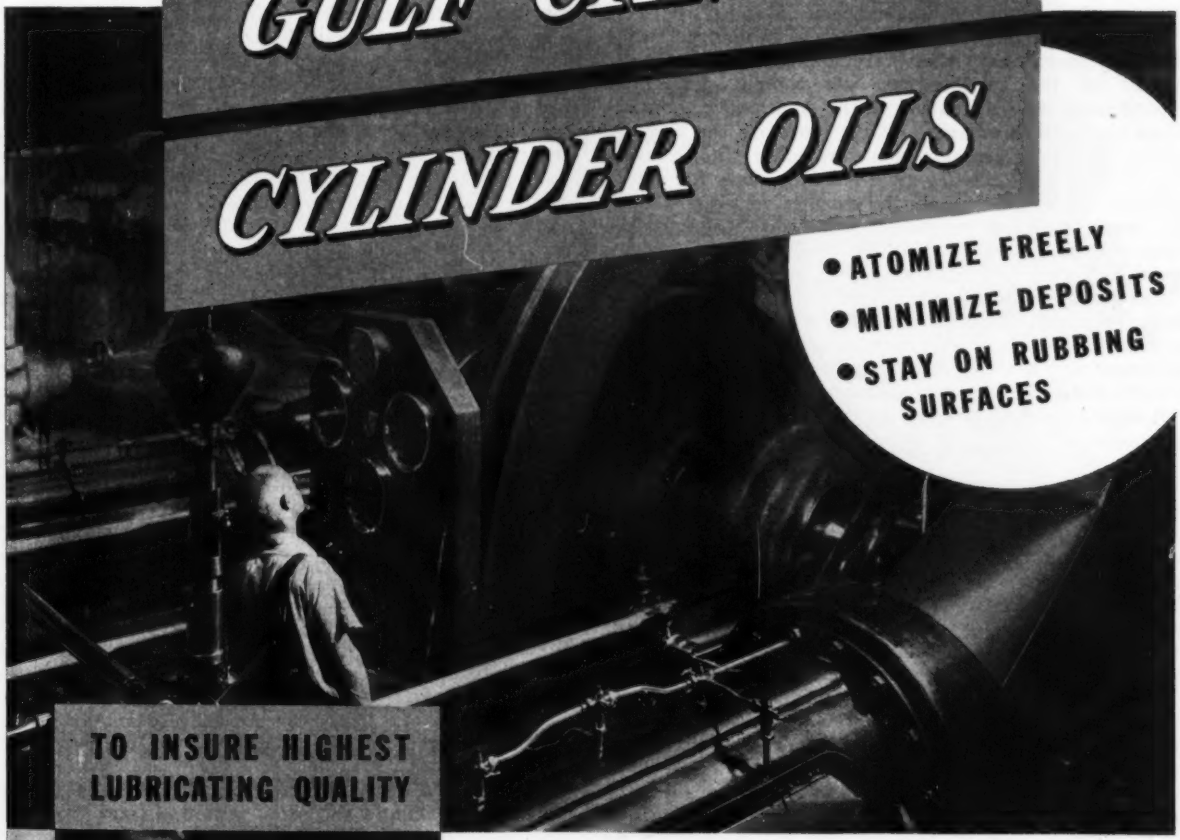
The National Association of Waste Material Dealers, Inc., through its managing director and a standing committee on this subject have had these bills up with the Chairman of the Committee on General Laws and have made a request for a public hearing.

If denied a public hearing, the Association will if Bill 1784 is passed, ask the Governor to grant a hearing before giving it his approval. If, in spite of everything that can be done, the Bill becomes a law its constitutionality will undoubtedly be tested in the courts.

New Catalog Pages Issued

T. B. Wood's Sons Company has just issued new catalog Pages 38-A and 38-B illustrating and describing their Universal Giant flexible coupling (known as Type "B").

GULF CRYSTAL CYLINDER OILS



- ATOMIZE FREELY
- MINIMIZE DEPOSITS
- STAY ON RUBBING SURFACES

TO INSURE HIGHEST LUBRICATING QUALITY

Gulf research engineers use this apparatus to study the effect of saturated or super-heated steam under high pressures on lubricating oil. Thus, better lubricants are developed to meet special conditions. This is just one of many steps Gulf scientists take to insure highest uniform quality in lubricating oils.

MANY steam engine operators—particularly those who demand ready separation of the lubricating oil from the condensate—have found Gulf Crystal Cylinder Oil the most efficient steam cylinder lubricant they can use.

This quality lubricant is made by a special Gulf process which frees the oil of wax and other impurities, greatly increasing its efficiency over oils refined by less effective processes.

Gulf Crystal Cylinder Oil atomizes very easily and is readily carried by the steam to all lubricating surfaces. It provides an extra measure of safety against high temperatures and bad water conditions, insuring minimum deposits in cylinders and valves.

For real economy, use Gulf Crystal Cylinder Oil.

GULF INDUSTRIAL LUBRICATION

GULF OIL CORPORATION · GULF REFINING COMPANY

GENERAL OFFICES, GULF BUILDING, PITTSBURGH, PA.

Merchandising Various Grades of Fine Papers*

By J. H. Londergan[1]

Our statistics indicate that between 55 and 60 per cent of all the fine paper produced by American manufacturers is sold by merchants. Also that from more than 80 per cent of all the sulphite and rag content writing to approximately 45 per cent of all the book paper produced moves through merchants. With more of the tonnage moving through merchants than any other single buying class, it looks like ordinary good business sense for manufacturers to examine closely the changes which are taking place in the paper distributing trade and those which are occurring simultaneously in the trades and industries served by paper merchants.

Viewed in a broad sense, there are already too many handicaps placed by both manufacturers and merchants on the free ultimate consumption of paper. Most of the handicaps are caused almost exclusively by a lack of accurate statistics and hasty decisions made without sufficient regard for long-range progress.

Retail Losses Important

Every analysis which our office has made points to a fundamental difficulty which steadily becomes more serious —the retail part of a wholesaling business. With rising costs of doing business, this problem takes on greater importance. The costs of retailing operations are largely labor and service charges which rise rapidly in a period such as the present. By way of illustrating how important the retailing losses are, let us consider one line of paper in one quantity bracket—the less than package sales of No. 1 sulphite bond. Our figures show that the loss to merchants in this bracket of sale is equal to three-fourths of all the profit they make on all the quantity brackets of this grade of paper.

Here are a few practical examples of what appear to be short-sighted policies on the part of both manufacturers and merchants. Let us consider first the manufacturing end.

Lines are produced without proper regard to the use which such papers will find in the graphic arts industries. Countless times in the past manufacturers striving solely to produce a new or unusual paper, put lines on the market presumably on the theory that the graphic arts industry will revise its equipment and processes so that it can use the papers which the manufacturer would like to sell. The lines fail, the merchant's stock is frozen for a long time, and the capital that could have been invested in profitable manufacture and distribution is tied up in dead merchandise There is an obligation on every manufacturer to look beyond his manufacturing problem to the ultimate purpose for which the paper is to be used. This may require a study of markets by the manufacturer to disclose the extent and possible uses of the product which he contemplates making, or it may take the form of obtaining from his qualified distributors true facts in connection with market possibilities.

Capacity for Consumption

All too frequently, manufacturers place lines upon the market solely because competitors having similar equipment have already offered such lines. The distributors of the later manufacturers are urged to carry merchandise which is directly competitive with that which they already stock and sell. No regard is given to the capacity for consumption and the ultimate result usually is that all of the manufacturers and all of the distributors of these lines simply sell smaller quantities because the market cannot absorb a large volume of so many practically identical lines. Such procedure is an indictment against the research and creative abilities of the manufacturers. For true progress it would have been far better to devote their efforts to finding papers which would accomplish to a greater extent the purpose of the ultimate consumer rather than making minor changes which in no way materially enhance the printed material or effect economies or improvements in its production.

Many manufacturers have equipment for processing paper after its manufacture, notably finishing equipment. In recent years there has been a decided trend toward placing upon the market various finishes of the same grade of paper without consideration being taken of the market's ability to absorb these additional finishes or to what the ultimate user can do with the paper. This has resulted in the spreading of orders over a large number of items without increasing the total consumption. Manufacturers' advertising is circulated freely to the ultimate buyer showing all finishes, all colors, all weights and all sizes with the result that the merchant who has neither the capital nor the inclination to stock all these finishes, colors, weights and sizes, is forced to order small quantities from the mill with resultant higher costs to both the manufacturer and merchant and without receiving anything to compensate the merchant in the way of extra price for the extra costs. involved.

Merchants' sales records conclusively prove that many of these finishes, colors and sizes do not warrant any investment in inventory and so many similar papers are already on the market that whatever novelty advantage did exist to make their sales justified has already vanished because of the over-abundant and unnecessary choice offered to the ultimate user. It would pay any group of manufacturers to analyze printed production in various important cities with the idea of ascertaining how much of the total production of printed matter is produced on these unusual finishes, colors and weights, and to accordingly gauge production based on consumption with allowance for possible changes in buying habits due to promotional activity.

Contrary to Principles

Now let us look at some practices on the part of merchants which appear contrary to the principles of good merchandising.

Many merchants carry entirely too many directly competing lines of paper. The salesman of such merchants becomes more of an order-taker than a salesman, and the economies that could be made through the larger stocking of one line and the resultant greater per sale volume are lost. You as salesmen of manufacturers should study the competitive lines of your merchant customer, so that the product which you place with him will have a fair chance of free distribution not unduly handicapped by directly competing lines.

Many merchants do not maintain reliable records on inventory and sales such as are necessary to make available

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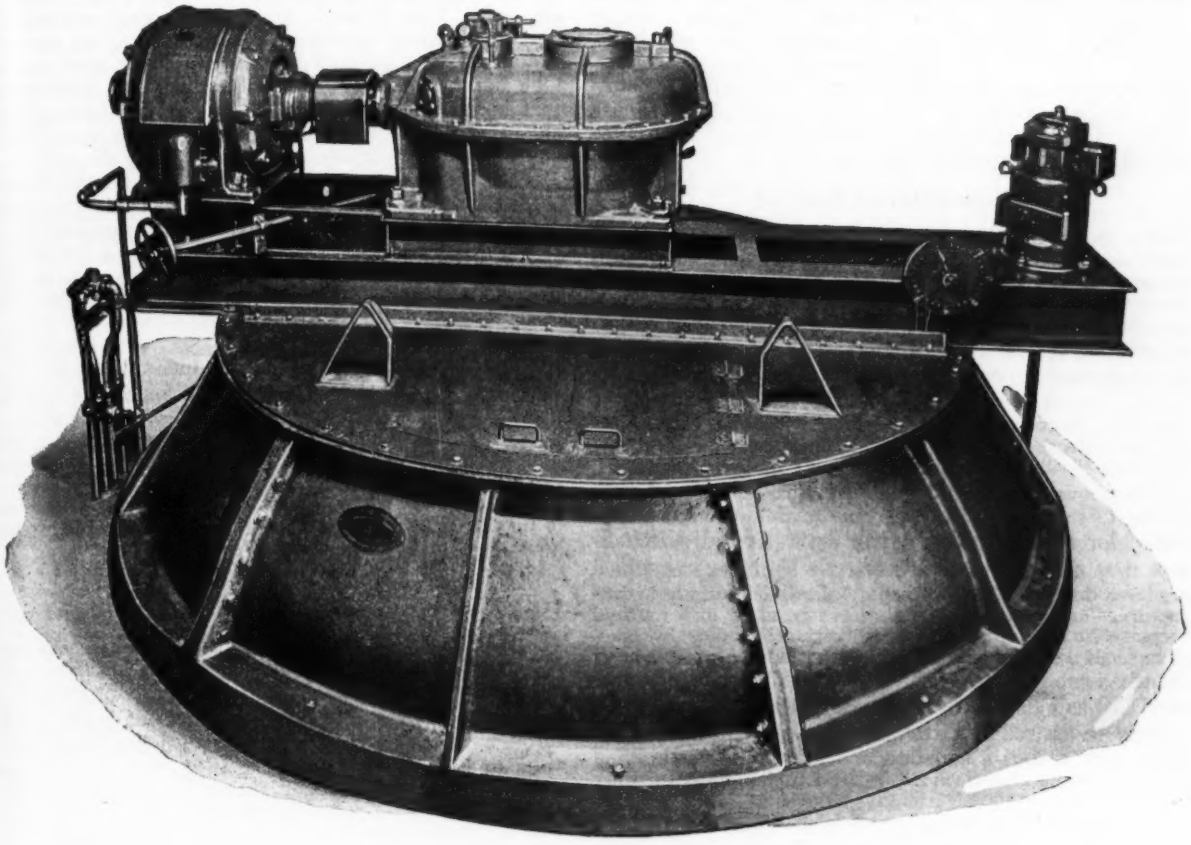
* Presented at the meeting of the Eastern Division of the Salesmen's Association of the Paper Industry, Hotel Lexington, New York, March 22, 1937.

[1] Assistant Secretary in Charge of Fine Paper Division, National Paper Trade Association of U. S.

Do You Want Beater Room Economy?



Then put in a Valley Vortex Beater. From every angle this beater reflects a different source of cost saving—

POWER: **Lowest H.P. Hrs./Ton on record.**

LABOR: **1. There is no waiting around in furnishing a Valley-Vortex. The beater will take stock *as fast as 2 men can throw it in.***

2. Beating tackle is changed in 5 to 6 hours.

PRODUCTION: **Twice the daily production of the average beater of similar size.**

THINK what this means to your power bill . . . .

THINK what the extra beating capacity means to your stock, already over-jordaned . . . .

And THINK of the other beater room economies suggested above . . . .

Why not have one of our representatives come in and discuss the matter with you. Write to the Valley Iron Works Company.

Also Manufacturers of
HIGH SPEED and
CONTINUOUS or BREAKER BEATERS

VALLEY
Iron Works Company

Plant: Appleton, Wisconsin
New York Office: 350 Madison Ave.
Canadian Representatives:
Pulp and Paper Mill Accessories, Ltd., Montreal Canada

45 YEARS OF BEATER-BUILDING EXPERIENCE

to ultimate purchasers the items of your merchandise which the market most frequently calls for. It would pay every manufacturer's salesman to study the average group performance of all his merchant customers and the general consumption of the market for each item in his line. These average records should be made available to each distributor. This involves an obligation not to overload the merchant or to recommend items which experience indicates are not free-moving items. The average experience of the manufacturer would materially help the merchant to arrive at a better balanced warehouse inventory. Dissemination of information of this type should result in increased sales.

Recommendations Nesessary

Not every merchant knows of the possibilities which exist for the marketing of the products which you sell to him. There is an obligation on the part of the manufacturer's salesmen to acquaint merchants with the sales possibilities for the line he stocks. This might take the form of pointing out the class of users of the product, the type of equipment on which they generally use it, and the technical considerations which make the paper adaptable for use. Specimens proving the above points are desirable and efforts of this nature on the part of manufacturers' salesmen should be effective in making better distributors.

The above recommendations are not made because in theory they look like good practices to follow. Our analyses of merchants' operations for several years past indicate they are absolutely necessary. The practices which we have described here as being followed by many manufacturers and many merchants have resulted in a marked increase in the number of small orders handled by merchants. It will probably surprise you to know that the merchant's average order for No. 1 sulphite bond amounts to $11.92 and this takes into consideration sales from the warehouse as well as direct from the mill. Small orders bring high costs of handling and result invariably in a loss to the merchant who is geared to handle them only on a wholesale basis.

The greater the choice available to the ultimate consumer in color, finish, weight, size and grade, the smaller becomes the average order and the more expense there is involved for both the manufacturer and the merchant. This expense in most instances is entirely unjustified in the light of actual use to which the paper is placed. By way of illustrating how serious this problem has become, it would be well to mention that over 98 per cent of all the orders which a merchant sells for all grades of Sulphite Bond are for less than sixteen cartons, and 90 per cent of all the orders which a merchant sells on these grades are for less than four cartons.

As representative of manufacturers, you probably have no idea of the average size of the order filled by the paper merchant from the merchandise which you sell in bulk to him. The increase in the small order business brought about by the almost limitless variety of sizes, weights, colors and finishes can have only one ultimate result—to materially increase to the consumer the price of paper.

Percentage of Sales Decline

In connection with this problem it should also be pointed out that since 1933 according to our statistics, the percentage of merchants' sales from warehouse in relation to their total sales has declined approximately 30 per cent. This shrinkage is due very largely to the inability of merchants to stock the countless items and unnecessary varieties of paper which the manufacturers advertise and attempt to place on the market.

The question is frequently raised whether the merchants are operating efficiently and distributing for manufacturers at the lowest possible cost. An analysis of our survey reports for 1936 received from a substantial percentage of our membership, shows that since 1933 merchants have reduced their distribution costs almost 25 per cent. This certainly demonstrates good management, but despite such economies the merchants' net operating profit last year amounted to only 1.86 per cent on sales. One important cause of this disappointing showing was that innumerable small orders for special items, not salable enough to justify merchants stocking them, had to be serviced unprofitably by shipment from the mill.

The advantages which have come to the industry through standardization and grading have been almost completely nullified by the countless unjustified specialties which have been added to the standard grading. If it is to continue at the present rate, the costs of distribution are bound to rise and be reflected in higher prices to the buyer and likely to the manufacturer.

There are today many merchants who are carrying over 4,000 warehouse items. At this rate it would not take long for the paper business to reach the condition prevalent in such industries as the printed cotton and silk industries which turn out so many transient styles and designs that periodically there must be a dumping to clean inventories.

This is a problem which you as salesmen, being closely in touch with your markets, can well bring to the attention of your production departments.

New Source of Artificial Daylight

It is a far cry from the sparkling bubbles in soda water to a new illuminant that accurately reproduces natural daylight. However, carbon dioxide gas—waste product of our breathing—is the gas that enlivens the soda water and also through electric excitation, produces a light of considerable value to all who work with color in the arts and industries. The Barkon Frink Tube Lighting Corporation, of Long Island City, N. Y., is manufacturing and distributing this new aid to accurate color control and discrimination.

For a third of a century, scientists have recognized that carbon dioxide, used in a tube similar to the familiar "neon" tube, would produce an unequalled artificial daylight, but have been unable to apply this knowledge in a practical manner. Unlike the "neon" in "neon" tubes, carbon dioxide has a useful life measured in minutes rather than in thousands of hours, because carbon dioxide becomes electrically inactive much more rapidly than "neon." It is necessary, therefore, to supply additional gas without disturbing the electrical characteristics of the tube. This is accomplished by the use of an electronic circuit invented by Dr. T. J. Killian, Research Director of the Barkon Tube Lighting Corporation of Seattle, Washington.

Japan's Wood Pulp Imports

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., March 3, 1937—Imports of wood pulp into Japan last year according to preliminary figures, reached a total of 365,700 short tons, an increase of 21 per cent over the imports for 1935 and of 44 per cent over the preceding year according to Commercial Attache Frank S. Williams at Tokyo.

Receipts from the United States dropped off sharply during December due to the Pacific Coast maritime strike. Nevertheless, the United States supplied 47 per cent of the year's total imports as against 40 per cent during the preceding year.

Philadelphia Paper Jottings

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., April 12, 1937—Over the signature of J. R. Howarth of J. R. Howarth Paper Company, member of Publicity Committee of Philadelphia Paper and Cordage Assn., a letter has been sent to all members of the association requesting that each one forward to Mr. Howarth 125 of his letterheads, containing as nearly as possible everything his "Company has for Sale", which in turn will be made up into a Directory for the use of the purchasing agent or buyer of each House for use when placing orders for necessary requirements. Says Mr. Howarth—"In the past few years we definitely know that by means of this directory, members received upwards of two hundred thousand dollars of business which, no doubt, would have been purchased elsewhere."

The J. L. N. Smythe Company, paper specializers, one of the oldest paper houses in this city, is moving to 1600 Callowhill street early in June of this year to obtain larger space for its offices and warehouse.

"Our increasing business," explained T. H. B. Smythe, president of the company, "covering Eastern Pennsylvania, Southern New Jersey and Delaware, on wrapping and printing papers, and our greatly enlarged distribution to the building trade in this area of Sisalkraft, and United States Gypsum products—Arborite, Hardboards and Red Top Wool—call for larger space and improved handling facilities outside of the very congested South Sixth street section of the city." Mr. Smythe added—"It is with deep regret that we are leaving Sixth and Ranstead streets, where we have been for twenty years."

The company will occupy two floors and a mezzanine in the new building at 16th & Callowhill streets, comprising 18,000 square feet of floor space; the first floor being devoted to officers of the company, salesmen and city order desk, the Accounting Department will be located on the mezzanine floor, and the second floor will be utilized as a warehouse.

The Smythe Company is now in its thirty-seventh year; it was established by J. L. N. Smythe Company as a wrapping paper house in 1900. In 1904, H. E. Platt joined the company, and today the sons of the founders are the operating heads of the business. The present officers include T. H. B. Smythe, president and treasurer; H. Elmore Platt, vice-president and secretary; W. C. Melcher, Jr., vice-president, and A. C. Shoemaker, assistant treasurer.

Empire State Paper Association

John V. McCarthy, of the J. & F. B. Garrett Company, Syracuse, N. Y., was elected president of the Empire State Paper Association at its annual meeting held in Buffalo last week.

Other officers elected were: H. L. Cowan, Franklin Cowan Paper Company, Buffalo, and Max S. Dilts, Hubbs-Howe Company, Buffalo; directors, S. T. Jones, Hudson Valley Paper Company, Albany, and George Beggs, Hubbs-Hastings Company, Rochester.

This association includes all wholesale paper distributors in New York State outside of New York City.

Gummed Industries Association Moves

The Gummed Industries Association is moving its offices on Saturday, April 17, to Room 1209, 19 West 44th street, New York. Telephone number — Murray Hill 2-6608.

M. J. Kelley Passes On

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., April 12, 1937—M. J. Kelley, one of the old school of American Paper makers, died at his apartment in Overbrook, Philadelphia, today.

"Mike" Kelley, as he was known to almost the entire industry, started as a boy in the paper mills in Holyoke. During his early days he was widely known as a baseball player throughout New England.

His first post of importance at a comparatively early age was that of superintendent of the old Dickinson-Clark mill in Holyoke, and later the Crocker mill, both of which are now part of the American Writing Paper Company.

In 1890, Mr. Kelley left Holyoke to take over the management of the mill at Singerley, Maryland, owned by *The Philadelphia Record*, where they were making paper from straw and the newly introduced wood pulp process. After remaining in Singerley for a few years he was called to Lock Haven by the late Colonel Paine of the New York and Pennsylvania Company as manager of the mill there. Mr. Kelley also supervised the construction and operation of the Johnsonburg plant of the New York and Pennsylvania Company.

In 1896, the late P. H. Glatfelter brought him to Spring Grove, Pa., as manager of the Glatfelter paper properties. The modernization of both the pulp and paper mills was placed in Mr. Kelley's hands. Then began an association with three generations of the Glatfelter family which lasted until Mr. Kelley's retirement in 1928. During Mr. Kelley's association with Glatfelter, it was his boast that he bought the raw materials, ran the mill and sold the product.

During many years of an extremely busy life, he came to be known by these activities to almost every one in the paper industry. He was one of the few survivors of that band of paper men that witnessed the transition of the paper industry from a comparatively small production based on rags and straw to the wood pulp era.

Mr. Kelley is survived by his wife, and one daughter, Miss Lillian S. Kelley of Philadelphia.

B. C. Newsprint Prices Advanced

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., April 10, 1937—Prices of newsprint in British Columbia have been increased from $42.50 per ton to $50.00 per ton, and thus the producers of the province have followed the lead given by Eastern firms who during March announced that their newsprint contract prices for the first six months of 1938 had been set at $50.00 per ton.

The two leading British Columbia producers, Powell River Company, operating at Powell River, B. C., and Pacific Mills Ltd., Ocean Falls, made simultaneous announcements of the increase.

A quota system of alloting the output has been brought into vogue in British Columbia, in response to an active market, and slight increases in price have already been put into effect since the beginning of 1937. Leaders in the industry have expressed the opinion that 1937 will be a year of extensive operation. A record production was reported during 1936.

Victory Paper Mill to Reopen

[FROM OUR REGULAR CORRESPONDENT]

VICTORY MILLS, N. Y., April 12, 1937 — The United Paperboard Company is making preliminary preparations for reopening the mill of the Victory Manufacturing Company here employing several hundred persons.

Reciprocal Trade Agreements

With import and export statistics for 1936 now available it is possible to make a better evaluation of the effect of the reciprocal trade agreements on the various divisions of the paper industry than has hitherto been possible, reports the Import Committee of the American Paper Industry.

When these agreements were proposed, it was stated by Administration spokesmen that it was expected that some industries would be called upon to make sacrifices in order that other branches of industry and agriculture might prosper. The 1936 statistics, compared with those of 1934, indicate divisions of the paper industry as among the groups to make sacrifice.

Exports of paper in 1936 were four million dollars more than in 1934, but eight million dollars lower than in 1929. Imports increased over twenty-three million dollars as compared with the pre-agreement year of 1934; of the increase of all but $1,000,000 was in items listed in various agreements.

The Cuban trade agreement was expected to give the American Paper Industry a much better market for its products. The increase in exports to Cuba was $385,000; this is about one tenth of the total increase in imports of dutiable paper. Exports to Canada of all papers were $1,500,000 above 1934 but five million dollars less than in 1929, while imports of Canadian newsprint, which the United States pledged itself to retain on the free list, increased twenty million dollars between 1934 and 1936.

Import statistics for 1934 and 1936 on items on which the United States reduced duties follow:

Grade	Trade Agreement with	1934	1936
Kraft Wrapping	Sweden—Finland	$297,909	$1,536,148
Paperboard	Sweden	509,806	910,130
Pulpboard in Rolls	Canada	317,627	434,113
Cigarette Paper	France	4,122,578	4,345,567
Sensitized Photo Paper	Belgium	310,186	322,101
Wrapping Paper Except Kraft	Sweden	59,417	70,902
Vegetable Parchment	Belgium	26,619	39,101
Papeterie	France	23,633	33,933
		$5,667,775	$7,691,995
Increase in imports of paper on which agreements reduced duties			$2,084,000
Total increase in imports of dutiable paper			$3,145,000

The above statistics do not tell the whole story. Imports of cigarette paper in the second half of 1936, when the duty rate of 45 per cent was effective, were $250,000 above the imports of the first six months, before the duty rate was lowered from 60 per cent. This quarter of a million dollars is equivalent to about half the total American production in the first six months.

Imports of Kraft included over 13,500 tons of M. G. Kraft, as compared with 3,500 tons in 1934. The 1936 imports were about 27 per cent of the total American production of 51,000 tons of this paper.

Vegetable parchment imports at the lower rate of duty were expected to increase materially. The increase was partially prevented by a reduction in the American price to approximately cost. This reduction resulted in the abandonment, temporarily at least, of plans for plant expansion and inability to make wage increases which management had hoped to put into effect.

It will be seen from the above review that the reciprocal trade agreements offer no promise to the paper industry, and that heavy losses were probably only averted because of the increased demand for domestic papers during most of last year.

Congress has passed and the President has signed the joint resolution providing a three-year extension of the authority given the Administration to enter into reciprocal trade agreements with other nations. This was an expected action, and the vote in Congress was essentially on party lines.

An agreement with San Salvador has been concluded, and awaits the approval of the Salvadorean legislators. It makes no concessions on exports of paper or paper products to that country, though duty reductions were asked by the American Paper Industry.

Norwood Engineering Co. Reorganized

Norwood Engineering Company, Florence, Mass., was discharged from receivership by the Federal Court in Boston on March 30, and the company has been reorganized. The company, which for over forty years has manufactured municipal and industrial filters and paper mill finishing machinery, has always been solvent, but was placed in receivership some time ago in order to conserve the assets of the company. Howard W. Hosford and G. Wilson MacDow, the company's chief executives, have been acting as receivers.

The reorganized company will have the corporate name of The Norwood Engineering Company. Howard W. Hosford, who has been associated with the present company for 36 years and has been president and general manager since 1917, will continue to serve in the same capacity, and G. Wilson MacDow, who has been treasurer of the company for a number of years will be treasurer and clerk of the reorganized company. These two, with three local Northampton business men, will be directors of the company.

Steady progress has been made during the period of receivership, with a healthy gain in sales volume, and the operation of the business has been entirely acceptable to the creditors, who approved the reorganization plans with the firm belief that the company is now financially capable of meeting all current obligations.

The company has recently made important improvements in its products and reports an appreciable amount of business lined up for 1937, so it is expected that the reorganization will clear the decks for a continued healthy growth.

New Brown Pyrometer Catalog

The Brown Instrument Company has just published a new catalog on Brown Pyrometers (Millivoltmeter Type). This new catalog (No. 15-C) covers the complete line of Brown Millivoltmeter Pyrometers—Indicating, Recording and Controlling. It describes the New Moisture-Proof Rotary Switch, Multiple Key Type Switch, Control Relays, Valve Mechanisms, Thermocouples and Accessories.

The Brown Optimatic (the only self-balancing optical pyrometer), Brown Analy-Graph (for furnace atmospheres), Protectoglo (the combusion safeguard)—all recent additions to the Brown line—are also illustrated.

The company will be pleased to send a copy of this catalog to any readers who request it. Address: The Brown Instrument Company, Wayne and Roberts Avenues, Philadelphia, Pa., and ask for Catalog No. 15-C.

Lift Truck Platforms

A new, small, colored folder No. 322 on Lift Truck Platforms and Lift Trucks, which the manufacturer claims is the most economical method of interior transportation of goods, materials and products, has just been issued by Lewis-Shepard Company, materials handling equipment engineers, 267 Walnut Street, Watertown (Boston), Mass. Copies on request.

Government Paper Awards and Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., April 14, 1937—The Government Printing Office has received the following bids for 10,000 pounds (96,000 sheets) of offset book paper; Paper Corporation of United States, at 5.92 cents per pound; Stanford Paper Company, 6.05 cents and 6.2 cents; Whitaker Paper Company, 6.35 cents and 5.91 cents; R. P. Andrews Paper Company, 6.06 cents; Mathers-Lamm Paper Company, 6.57 cents; Barton, Duer & Koch Paper Company, 6.2 cents; and Old Dominion Paper Company, 6.049 cents.

For 11,110 pounds No. 1 rope manila paper; Whitaker Paper Company, 9.75 cents per pound.

The Russell Products Company will furnish 500 pounds of 19 x 24 inch facing stereo tissue paper at 83 cents per pound, bids for which were received on March 22.

The Printing Office has also received the following bids for 17,000 pounds of sulphite manial book pockets; R. P. Andrews Paper Company, 5.545 per M; Oles Envelope Company, $5.85 less 3 per cent; Gaylord Brothers, $3.25; Mathers-Lamm Paper Company, $4.99; and M. G. Ginn & Co., $6.56 less 2 per cent.

For 13,750 pounds (110,000 sheets) of 100 per cent rag white M. F. book paper; Stamford Paper Company, 18.04 cents; Whitaker Paper Company, 19.91 cents; Mathers-Lamm Paper Company, 24 cents; and Paper Corporation of United States, 20.95 cents.

For 36,000 pounds (86,000 sheets) of manila cardboard; Graham Paper Company, 4.35 cents; Reese & Reese, Inc., 4.35 cents; Whitaker Paper Company, 4.35 cents; R. P. Andrews Paper Company, 4.32 cents; and Old Dominion Paper Company, 4.54 cents.

For 36,000 pounds (105,000 sheets) of 50 per cent rag, white ledger paper; Walker-Goulard-Plehn Company, 16.45 cents; Graham Paper Company, 11.95 cents; R. P. Andrews Paper Company, 11.85 cents; Reese & Reese, Inc., 11.73 cents; and Barton, Duer & Koch Paper Company, 11.44 cents.

For 10,000 pounds of manila cardboard; Reese & Reese, Inc., 4.69 cents; Whitaker Paper Company, 4.32 cents; Graham Paper Company, 4.35 cents; R. P. Andrews Paper Company, 4.32 cents; and Old Dominion Paper Company, 4.94 cents.

For 10,000 sheets of buff railroad board; Virginia Paper Company, $30.55 per M sheets; Whitaker Paper Company, $30.55; Old Dominion Paper Company, $30.98; L. Hyman & Sons, $31.00; Reese & Reese, Inc., $30.55; and Dobler & Mudge, $30.19.

Waste Dealers to Honor J. Schapiro

The New York Luncheon Club of the National Association of Waste Material Dealers, Inc., will hold its April Luncheon on Tuesday, April 20th in the Colonial Room of the Aldine Club, 200 Fifth Avenue, New York.

The April Luncheon will be in the nature of a reception to the new president of the National Association of Waste Material Dealers, Inc., Joseph Schapiro, and on account of this fact and the limited number that can be accommodated it will be necessary for those planning to attend to make reservations in advance. A substantial number of out-of-town visitors are expected and some special entertainment may also be provided for this particular Luncheon.

There will be no increase in the cost of the Luncheon which will be $1.50 per person including refreshments served from 12:30 to 1:00 as well as the Luncheon served from 1:00 to 2:00 P. M.

Colorimetric Analysis and Electronics

The Department of Chemistry of Washington Square College, New York University, will offer two intensive three weeks courses in "Colorimetric Analysis" and "Electronics" from May 24 to June 12. Both courses may be taken simultaneously if desired. Each will consist of fifteen lectures and fifty hours of laboratory work with optional attendance at conferences.

The Colorimetric Analysis course under the direction of Professor Ralph H. Muller will be devoted to a discussion of fundamental optical principles, the use of various colorimeters, photometers, the spectrophotometer and the spectrograph. Emphasis will be placed upon photoelectric methods. The laboratory work will acquaint the student with the use and operation of these instruments and their application to representative problems.

The Electronics course, under the direction of Dr. Raymond L. Garman, will deal with the fundamental theory of electron tubes and associated equipment with emphasis on applications to chemical research and industrial control. The laboratory exercises will include graded experiments with vacuum tubes, photocells, cathode ray tubes and thyratrons, and representative physico-chemical measurements utilizing these devices.

In both courses properly qualified students will have the opportunity to develop new applications.

Further information may be obtained by addressing the Administrative Chairman, Department of Chemistry, Washington Square College, New York University, New York.

New Model Electroaire Ozonator

The new "FO" Electroaire Ozone Generator is as modern and attractive in appearance as the latest types of office or home furniture. It is manufactured in two sizes, one of which is capable of Ozonating 8,000 cubic feet, the other capable of Ozonating 20,000 cubic feet. The panels are jet black Bakelite trimmed in gleaming Cromium-plated trim which gives a striking and pleasant contrast.

A marked improvement for this type of machinery is the "Roto-Beem" Circulator used in place of the ordinary fan. This patented air-circulator builds up a spiraling air stream which, like a whirlwind, sucks in air from all sides and from ceiling to floor, giving a faster and greater and wider volume of air distribution; and, consequently, a faster and greater distribution of Ozone than has hitherto been possible. The air stream also is given a gentle pulsating action which is very noticeable, and which emphasizes the pleasant effect produced upon occupants.

One of these circulators has proven to be as effective in ventilation as six to eight conventional-type fans, and by actual tests was found to be the most effective Ozone distributor and circulator obtainable.

The purpose of the Electroaire Corporation, 1455 West Congress street, Chicago, Ill., in developing this new model was to meet the constantly increasing demand for an attractive and modern-looking Ozone generator to destroy odors and freshen air in buildings or offices where occupancy, tobacco smoke, moldy or other odors are prevalent.

Black-Clawson Folder Issued

The Black-Clawson Company, of Hamilton, Ohio, owners of Shartle Bros. Machine Company, of Middletown, Ohio, has just published an illustrated folder describing the unusual economies of the new Black-Clawson supercylinder paper machine.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Roanoke Rapids, N. C.—The Albemarle Paper Manufacturing Company, Richmond, Va., manufacturer of kraft paper products, has concluded arrangements for purchase of mill of the Halifax Paper Company, Inc., Roanoke Rapids, manufacturer of similar paper stocks, and will take over property at once. New owner has plans under way for immediate expansion and improvements in acquired mill, which will be operated as a branch plant in the future. It is proposed to carry out extensions in the sulphate pulp mill at the Halifax plant, with installation of additional equipment to increase capacity to about 100 tons per day. Part of output will be used at the local mill, while remainder will be shipped to Albemarle mill at Richmond, as well as other plants of the company. Project is reported to cost in excess of $100,000, with machinery. At a later date, the paper-making division at Roanoke Rapids mill will be enlarged by new owner, with installation of another paper machine and auxiliary equipment for large advance in present output. H. W. Ellerson is president of the Albemarle company.

Phelps, Wis.—The Northwood Chemical Company, care of E. T. Olson, Marquette, Mich., recently organized by Mr. Olson and associates, has concluded negotiations for purchase of plant property at Phelps, and plans early expansion, with complete new division for the production of wood fiber products. Work on new unit is expected to begin early next summer and will be equipped for large capacity. Plans are now in progress for new mill, as well as for a new laboratory and office unit. Work on laboratory is expected to begin at early date. M. K. Reynolds is vice-president of new company, and A. O. Reynolds, secretary and treasurer.

Franklin, Va.—The Chesapeake-Camp Corporation, organized a few months ago with capital of $3,500,000, to construct and operate a new kraft pulp and board mill at Franklin, as previously reported in these columns, is pushing construction of plant and work is in progress on superstructures for different units. Contracts are being let for different equipment, including an award to the Blaw-Knox Company, Blawnox, Pa., for sulphate pulp digester equipment. New mill will be equipped for an initial capacity of about 200 tons per day and is estimated to cost approximately $3,000,000, with machinery. It is scheduled for completion before the close of the year. The Rust Engineering Company, Clark Building, Pittsburgh, Pa., is general contractor. J. E. Sirrine & Company, 215 South Main street, Greenville, S. C., are supervising engineers. New company is a joint interest of the Albemarle Paper Manufacturing Company, Richmond, Va., the Chesapeake Corporation, West Point, Va., and the Camp Manufacturing Company, Franklin. J. L. Camp, Jr., is president.

Mount Vernon, Ohio—The Shellmar Products Company, manufacturer of cellophane products for wrapping service, has plans under way for new addition to local plant, to be two-story, estimated to cost over $50,000, with equipment. It will be used in part at present for storage and distributing service, and later will be converted for manufacturing purposes. Main offices of company are at 224 South Michigan avenue, Chicago, Ill.

Sand Springs, Okla.—The South West Box Company, manufacturer of corrugated paper boxes and containers, has approved plans for new addition to local plant, to be one-story, 80x84 feet, estimated to cost over $25,000, with equipment. It will be used for expansion in storage and distributing division. General erection contract has been let to the Truscon Steel Company, Oklahoma City, Okla., and work will begin at early date. W. H. Wolaver, Tulsa Loan Building, Tulsa, Okla., is architect.

Parchment, Mich.—The Kalamazoo Vegetable Parchment Company, Parchment, near Kalamazoo, will use new addition to mill, recently referred to in these columns, for increased production of wrappers for soap, fruit and other food products, manufactured under special processing treatment, and is arranging details of equipment installation, to include a Bagley & Sewell paper machine. New unit will be two-story, instead of one-story, as previously announced, 94x529 feet, with lower floor to be used for manufacturing division and upper story for storage and distribution. It is expected to have the new structure ready for service late in the fall. It will cost in excess of $250,000, with machinery. M. C. J. Billingham, Kalamazoo, is architect and engineer, and will be in charge of erection. Ralph A. Hayward is president and general manager.

Lockport, N. Y.—The Upson Company, Upson Point, manufacturer of pulp board products, fiber specialties, etc., has completed plans for new addition to steam power house at local mill, to be one-story and basement, estimated to cost close to $50,000, with equipment. Bids have been asked on general contract and work is scheduled to begin at early date. Charles A. Upson is president.

Jacksonville, Fla.—The National Container Corporation, Review and Borden avenues, Long Island City, New York, N. Y., manufacturer of corrugated boxes and containers, has awarded general contract to the Merritt-Chapman & Scott Corporation, 17 Battery place, New York, for proposed new kraft pulp and paper mill at Jacksonville, where large tract of land has been acquired, as recently noted in these columns. Plant will comprise large group of one and multi-story units, to be equipped for an initial capacity of close to 200 tons per day. Work is scheduled to begin soon. Company is also concluding financing through the sale of bonds and stock to provide funds for project, the maximum cost of which is placed at $3,260,000, including land purchase, buildings and equipment, and operating facilities. Samuel Kipnis is president.

York, Pa.—The Penn Fiber Board Company, Spring Garden Township, manufacturer of fiber board products, is planning early rebuilding of portion of storage and dis-

tributing department at plant, recently destroyed by fire. An official estimate of loss has not been announced.

Brunswick, Ga.—The Brunswick Pulp and Paper Company, Brunswick, recently organized as a joint interest of Mead Corporation, Chillicothe, Ohio, and Scott Paper Company, Chester, Pa., is pushing construction of new local mill on large tract of land, previously referred to in these columns, and superstructures are under way on several main units. Company is awarding contracts for various equipment for plant, including contract to Blaw-Knox Company, Blawnox, Pa., for digester equipment for sulphate pulp mill, and to Rice, Barton & Fales, Inc., Worcester, Mass., for a 156-inch Fourdriner paper machine, the latter at a reported price of $260,000. New mill will represent an ultimate investment of $3,500,000 and is scheduled for completion by the close of this year. Stone & Webster Engineering Corporation, 90 Broad street, New York, N. Y., is general contractor. Charles R. Van de Carr, vice-president of Mead Corporation, is president of Brunswick company.

San Francisco, Cal.—The Acme Paper Company, 1060 Howard street, plans rebuilding of portion of local plant, recently damaged by fire, with loss reported over $40,000, including equipment and stock.

Fort William, Ont.—The Great Lakes Paper Company, Ltd., manufacturer of newsprint, has approved plans for new one-story addition to mill on Neebing avenue, to be 125x250 feet, reported to cost over $150,000, with equipment. General erection contract has been awarded to the Barnett-McQueen Construction Company, Ltd., 460 Christina street, Fort William, and work will be placed under way at early date.

Hull, Que.—The E. B. Eddy Company, Ltd., manufacturer of book papers, paper board specialties, newsprint, etc., has plans under consideration for construction of a new mill on Laurier avenue, to be equipped for expansion in sulphite pulp division. It is reported to cost in excess of $500,000, including equipment. Work on project is expected to be placed under way this spring. The Foundation Company, Ltd., Montreal, Que., is advisory engineer for project.

New Companies

New York, N. Y.—The Niagara Paper Products Corporation has been organized with capital of 75 shares of stock, no par value, to manufacture and deal in paper products. New company is represented by the Albany Service Company, Inc., 315 Broadway, New York.

Everett, Mass.—The Commonwealth Reed and Fibre Company, Inc., 25 Bartlett street, has been chartered with capital of 150 shares of stock, no par value, to manufacture and deal in fiber products and affiliated specialties. Angelo Cardello is president, and Paul Leverone, treasurer.

Clifton, N. J.—The Clifton Waste Paper and Stock Company, Inc., has been incorporated with capital of $25,000, to deal in waste paper. New company will take over and succeed to the Clifton Waste Paper Company, Inc., 73 East Clifton avenue, Clifton. John A. Celentano, 215 Dayton avenue, Clifton, attorney, represents the new company.

New Lawrence Pump Catalog

The Lawrence Pump and Engine Company, of Lawrence, Mass., has recently brought out a new line of Single Suction Double Ball Bearing Centrifugal Pumps for handling acids, alkalis, hot and cold water, etc., known as the Lawrence "Vortex" type "SC", which is illustrated and described in bulletin D-46 just issued.

TO OPEN BIDS MAY 17

(Continued from page 21)

4,520,000 pounds machine-finish book paper.
300,000 pounds antique book paper.
65,000 pounds lightweight machine-finish book paper.
210,000 pounds 50 per cent rag machine-finish book paper.
15,000 pounds 75 per cent rag laid antique book paper.
25,000 pounds 100 per cent rag antique book paper.
1,190,000 pounds supercalendered book paper.
300,000 pounds half-tone book paper.
640,000 pounds coated book paper.
20,000 pounds lithograph paper.
3,560,000 pounds mimeograph paper.
400,000 pounds U S M O safety writing paper.
6,000 pounds U S M O writing paper.
4,000 pounds safety writing paper.
5,782,500 pounds writing paper.
295,000 pounds map paper.
1,025,000 pounds manifold paper.
5,376,000 pounds bond paper.
896,000 pounds ledger paper.
870,000 pounds index paper.
2,500 pounds tissue paper.
255,000 pounds cover paper.
420,000 pounds manila paper.
536,000 pounds kraft paper.
1,000 pounds paraffin paper.
400,000 sheets gummed paper.
96,000 pounds blotting paper.
2,500 pounds stereotype molding paper.
20,000 pounds oiled manila tympan paper.
2,000 pounds plate-wiping paper.
2,000 pounds back-lining paper, for case making.
10,000 pounds high finish red sulphite.
90,000 pounds manila tag board.
1,090,000 pounds calendered tag board.
20,000 pounds manila cardboard.
165,000 sheets railroad board.
550,000 pounds bristol board.
6,000,000 pounds United States postal card bristol board.
19,000 sheets pressboard.
4,000 pounds news board.
810,000 pounds chip and strawboard.
15,000 pounds marble grained board.
36,000 pounds box board.
350,000 pounds binder's board.

In cases where more than 1,000 reams are called for, proposals will be received for 1,000 reams or more.

Estimated Quantity of Envelopes

The estimated quantity of envelopes to be used include the following:

35,200,000 Light-brown (Kraft Shade).
9,625,000 Writing, Suphite, White and Colored.
185,000 100 per cent Rag Writing, White and Colored.
425,000 Ledger, White.
1,760,000 Bond, 50 per cent Rag, White.
332,000 Bond, 100 per cent Rag, White.

New Catalog on Graphic Meters

The Esterline- Angus Company, Indianapolis, Ind., has just issued a new 88 page catalog describing its complete line of graphic instruments. The book illustrates seven types of instrument cases, twenty-one different chart drives and twenty-four kinds of meter elements. The publication is designated as Catalog 337.

PAPER TRADE JOURNAL

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COMING EVENTS IN THE PAPER INDUSTRY

NEW ENGLAND SECTION, Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Nonotuck Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION, Technical Association of the Pulp and Paper Industry—Fourth Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION, Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION, Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park-American Hotel, Kalamazoo, Mich.

AMERICAN PULP AND PAPER MILL SUPERINTENDENTS ASSOCIATION, Annual Meeting, Springfield, Mass., June 23-25.

PRICE CONTROL PROBLEM

The swift advance in commodity prices that took place in the latter part of 1936 and has continued into 1937 has become one of the most conspicuous phases of the recovery movement, not only in the United States but in most foreign countries as well, states the Guaranty Trust Company of New York in the current issue of *The Guaranty Survey*, its monthly review of business and financial conditions in the United States and abroad, which has just been published.

"In general, the rise is welcomed both as a further evidence of trade revival and because it tends to correct the disparities between price groups that were created by the precipitous decline in the early years of the depression," *The Survey* continues. "It is recognized, however, that a too-rapid advance in prices is not without danger, particularly at a time when some of the underlying factors are artificial or abnormal. Consequently, the momentum of the rise in certain commodity markets in recent weeks has not been regarded with unmixed satisfaction.

"The price advance has been attributed to a number of causes, all of which have probably had more or less influence. In part, it is a perfectly normal recovery from the low levels reached in the depths of the depression. This recovery has been stimulated, however, by a number of special causes, some of which are likely to be temporary in their influence, while others may possibly become progressively stronger as time goes on. Large amounts of government funds have been spent for relief, public works, and armaments. Some of these funds have been borrowed from banks; and their expenditure has resulted in a swollen volume of bank deposits. Output has been restricted and costs have been raised by a number of restraints on production and trade. Some commodities have been subjected to production and export quotas, which have not been raised promptly enough to permit supply to keep pace with demand. Output has been lowered by strikes, reduced working hours, and shortages of skilled labor in some industries and some localities. These factors, together with wage increases, have raised costs. Gold production has increased sharply during the depression.

"Currency devaluations have, of course, played an important part, although the connection between the gold contents of currency units and general price levels under present conditions is not so direct as is sometimes supposed. Alterations in exchange rates due to currency devaluations have an immediate effect on prices of the great staple commodities entering into international trade, but it is only gradually that these changes are fully communicated to general price levels within the various countries. Finally, such conditions as world-wide monetary instability, unbalanced budgets, and the fear of war have impaired confidence in future currency values and have resulted in speculation and in flights of capital from some countries.

"Most of these factors are still operative. National budgets almost everywhere are unbalanced, and expenditures for armaments are increasing. The fear of war and of the economic and monetary disorders that it would cause hangs over the world. Currency devaluations have not yet exerted the full effects on prices that would naturally be expected in the long run on theoretical grounds. Moreover, as long as currencies remain unstabilized, the danger of further devaluation exists.

"The United States faces a special set of problems in the matter of price control, in addition to those confronting other countries. Flights of capital have had the effect of bringing large quantities of gold here, and this gold has increased both bank deposits and bank reserves. Deposits have been further increased by the largest volume of government borrowing and spending ever seen in times of peace, and the increase in commercial bank reserves has been augmented by the absorption of a part of the public debt by the Federal Reserve banks.

"It is clear that the monetary and banking system of the United States is capable of supporting a much greater volume of business than now exists, and at a much higher level of prices. The inflationary possibilities of the situation have been recognized for some time, and the central banking authorities have taken steps to prevent these possibilities from materializing. Moreover, further steps remain at their disposal.

"It appears that the central banking system of the United States has ample power to prevent the existing situation from developing into a price inflation, provided the Federal budget can be brought under control. If the budget is not balanced, it will be impossible for the banking authorities to make full use of their power over credit,

because in that event the market for new Government obligations must be maintained. Even of the budget is balanced, it will be requisite for the central banking authorities to exercise their power with the courage, foresight, and freedom from political pressure that were apparently contemplated by the legislators who placed the banking system under centralized control. The problem will be complicated by the fact that a large part of the earning assets of the banks for some time to come will consist of investments in Government securities and that the open-market powers of the Federal Reserve system must be exercised in such a way as to avoid depressing the prices of those securities to an extent that would seriously impair the value of bank resources.

"Nor can the problem be dissociated from that of world prices in general. Even if the financial authorities in the United States should find themselves fully capable of coping with the situation at home, it would be difficult, if not impossible, for them to maintain the value of the dollar in the face of continuing depreciation abroad. The problem of price control is, in the last analysis, a world problem; and the outcome of the present situation will remain highly uncertain until international currency stabilization is achieved. Stabilization appears impossible of attainment at present, but it must continue to be the goal of financial statesmanship if the world is to be extricated from the monetary disorder into which it has fallen as a result of the war and its aftermath. In the meantime, the degree of *de facto* stabilization that has been accomplished must be maintained by continued international cooperation."

Perkins & Squier Co. Changes

Perkins & Squier Company, general paper merchants, of 225 West 34th street, New York, have announced a change in the ownership of the company as of April 1, 1937. George F. Perkins, who has been president since its organization over thirty years ago, has retired as president and the ownership of the company has been taken over by G. Gorton Baldwin, who is its president, George F. Perkins, Jr., its vice-president and Edwin W. Goebel its treasurer and secretary. Mr. Perkins, Sr., will remain as a director.

Mr. Baldwin has been connected with the company since 1922 and is the son of the late George B. Baldwin, former partner of Mr. Perkins. Mr. Perkins Jr. has been with the company since 1926 and Mr. Goebel, the treasurer and secretary, since 1909.

The active association of these new officers in the successful conduct of this business over a long period of years, will indicate their fitness to assume its entire management, with no change of policy in its affairs.

Beveridge Opens Sample Department

The Beveridge Paper Company, of Indianapolis, Ind., has now installed a complete sample department to take care of all requests promptly for samples of any of its products, in charge of W. J. Blackley, Jr.

This sample department is located on the second floor of the warehouse building, is lighted by the indirect method, and is decorated in ivory and light green.

Production Ratio Report

The following statistics are based upon paper production reports to the American Paper and Pulp Association:

COMPARATIVE MONTHLY SUMMARIES

Months	1937	1936	1935	1934
January	90.3% (c)	76.1%	65.8%	.....
February	90.1% (c)	77.9%	70.0%	.....
March	89.1% (c)	76.0%	70.5%	.....
April	.....	82.3%	70.0%	.....
May	.....	81.6%	69.4%	.....
June	.....	80.7%	72.3%	.....
July	.....	77.3%	64.9%	.....
August	.....	81.5%	70.9%	.....
September	.....	80.5%	71.9%	58.2%
October	.....	87.6%	75.6%	64.7%
November	.....	88.0%	75.3%	61.7%
December	.....	85.9%	71.2%	59.6%
Year Average	.....	81.3%	70.5%	.....
Year to Date First 13 weeks	89.8% (c)	76.6%	68.5%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1937		CORRESPONDING WEEKS, 1936	
*March 6	88.5% (c)	March 7	79.4%
*March 13	90.0% (c)	March 14	78.5%
*March 20	89.6% (c)	March 21	71.0%
*March 27	89.2% (c)	March 28	75.0%
*April 3	88.2% (c)	April 4	80.2%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting, Current Weeks				
Ratio Limits	March 6, 1937	March 13, 1937	March 20, 1937	March 27, 1937	April 3, 1937
0% to 50%	41	32	39	37	32
51% to 100%	274	282	274	263	191
Total Mills Reporting	315	314	313	300	223

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported on January 4, 1937 Machine Improvement Survey.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours", were as follows:

Months	1937	1936	1935	1934	Months	1937	1936	1935	1934
January	78%	61%	61%	....	July	.....	69%	59%	....
February	.....	67%	67%	....	August	.....	75%	65%	....
March	.....	68%	67%	....	Sept.	.....	76%	69%	62%
April	.....	70%	61%	....	October	.....	82%	76%	63%
May	.....	68%	61%	....	November	.....	79%	70%	56%
June	.....	68%	65%	....	December	.....	74%	60%	52%

Week ending Feb. 6, 1937—86%
Week ending Feb. 13, 1937—86%
Week ending Feb. 20, 1937—85%
Week ending Feb. 27, 1937—86%
Week ending March 6, 1937—86%
Week ending March 13, 1937—84%
Week ending March 20, 1937—87%
Week ending March 27, 1937—88%
Week ending April 3, 1937—85%

New Paper Mill for South Africa

The Union Corporation, Ltd., has offered stock to the public in the Union of South Africa, funds to be used for the erection of a mill to manufacture various grades of writing, printing, and wrapping paper. Newsprint will not be produced. The pulping will be done by the Pomilio chlorine process, adapted to South African raw materials, such as corn cobs and pinus patula thinnings. Timber requirement options have been obtained from the Transvaal Gold Mining Estates. The plant will be located on the Vaal River, and all equipment purchases are being made through the offices of the Union Corporation, 95 Gresham street, London.

Eyes of Science Shown

"Eyes of Science" a motion picture devoted to the application of optical instruments to industry, was presented at the April meeting of the Technical Staff of the National Oil Products Company, of Harrison, N. J. More than fifty, including Charles P. Gulick, president, attended the meeting. The film was shown by J. H. Scheick and E. H. Anthes, of Bausch & Lomb, Rochester, N. Y.

It's
PRECIOUS LIQUOR
to Jim Lester

•

THERE'S more to Jim Lester's job in Mathieson's plant at Saltville, Virginia, than just filling liquid caustic tank cars. His is the task not only to see that cars are properly filled, but to make sure that each car interior is clean and free from defects before filling, that pipe lines, valves, pumps are all in perfect condition. On him rests a goodly share of the responsibility for the uniform purity of Mathieson Liquid Caustic when it arrives at your plant.

One reason Jim Lester carries this responsibility so well is his frank respect for the quality of Mathieson Caustic. Throughout the eleven years he has worked at Saltville, this man has watched his company steadily improve its processes, has seen it lead time and again in producing caustic which set new standards for purity and uniformity. With such a background, it is no wonder Jim Lester regards the product in his care as "precious liquor"—no wonder that, like all of the men behind Mathieson Chemicals, he spares no pains to deliver you a dependable product of uniform, outstanding purity.

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Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

Pacific TAPPI Discusses Wood Preparation

The Pacific Section of the Technical Association of the Pulp and Paper Industry met at Port Angeles, Wash., April 6, 1937.

Paul Leuth of the Sumner Iron Works, Everett, presented a very interesting and comprehensive paper on the Various Phases of Wood Preparation. This talk was well illustrated by slides showing the machines and their actual use. Fred Nicholson of the Stetson-Ross Manufacturing Company, Seattle, showed two reels of moving pictures on the Various Phases of Wood Preparation, particularly the boring and routing machines for cleaning the wood of bark and knots. His paper accompanying the pictures described and analyzed many of the problems connected with his subject. The discussion following was led by Mr. Chet Mulledy, Superintendent of the Olympic Forest Products Company. One interesting point of the discussion was the pointing out that many times the sawyer could expose wood dirt advantageously by cutting the cants with a broad surface or slash grain, rather than vertical. Mr. George Douglas, Chief Chemist of the Washington Pulp and Paper Company, was in charge of the arrangements for this meeting. He did a very good job as there were 105 men present. Mr. Carl Fahlstrom of the Longview Fibre Company, our Section Chairman, presided at the meeting.

This is our last dinner meeting of the year, and it has certainly been gratifying to us to see the interest that has been taken in these dinner technical meetings during the past two years. At the Port Angeles meeting, there were seven men up from the vicinity of Portland, which is 250 miles away.

Those Who Attended

Jerry Alcorn, Weyerhaeuser Timber Company, Everett; Ray Austin, Washington Pulp and Paper Company, Port Angeles; B. A. Bannan, Western Gear Works, Seattle; C. Vernon Basom, T. H. Beaume and A. F. Benson, Fibreboard Products Company, Port Angeles; Chas. Belvin, Chromium Corporation of America, Portland, Ore.; A. L. Bibbins, Electrical Steel Foundry, Seattle; Paul Blatter, Olympic Forest Products Company, Port Angeles; L. D. Blodgett, U. S. Forest Service, Port Angeles; Jim Brinkley, Lea Hotel, Seattle; J. W. Bonnar, Fibreboard Products, Inc., Port Angeles; A. F. Brunson, National Paper Products, Port Townsend.

H. E Brikowsky, National Paper Products, Port Townsend; P. G. Cannon, Everet A. Carlson,, H. J. Cathcart and Henry V. Charnell, Jr., Olympic Forest Products Company, Port Angeles; O. S. Cauvel, Washington Pulp and Paper Company, Port Angeles; E. J. Cavanaugh, Fibreboard Products, Port Angeles; George W. De Sellem, Westinghouse Electrical and Manufacturing Company, Seattle; G. S. Douglass, Washington Pulp and Paper Company, Port Angeles; Ray Dupuis, Washington Pulp and Paper Company, Port Angeles; Geo. E. Durkee, Shaffer Pulp Company, Tacoma; E. F. Drake, National Paper Products Company, Port Townsend.

R. E. Drane, St. Helens Pulp and Paper Company. St. Helens, Ore.; M. L. Edwards, Weyerhaeuser Timber Company, Longview; Girard C. Eck, Rainier Pulp and Paper Company, Shelton; Harold A. Erikson, A. B. Svenska Flakt-fabriken, Stockholm, Sweden; Carl Fahlstrom, Longview Fibre Company, Longview; James D. Fraser, Weyerhaeuser Timber Company, Everett; Harold Thomas, Olympic Forest Products, Port Angeles; William R. Gibson, Shibley Company, Seattle; Howard C. Graham, Washington Pulp and Paper Company, Port Angeles; H. M. Gustafson, General Electric Company, Seattle; Rolla W. Halbert, Olympic Products, Port Angeles; R. S. Hanchett, Fibreboard Products, Port Angeles.

John S. Hardy, Olympic Forest Products, Port Angeles; E. N. Harris, Olympic Forest Products, Port Angeles; Tom Hargreaves, Washington Pulp and Paper Company, Port Angeles; Nelson Hartmagle, Fibreboard Products, Port Angeles; H. A. Hauff, Weyerhaeuser Timber Company, Longview; Clayton Hay, Evening News, Port Angeles; Henry Hendrickson, Olympic Forest Products, Port Angeles; Wm. S. Hodgson, Fibreboard Products, Inc., Port Angeles; Albert Hooker, Hooker Electrochemical Company, Tacoma; Geo. W. Houk, Hooker Electrochemical Company, Tacoma; R. C. Hutchinson, Olympic Forest Products, Port Angeles; H. M. Jones, Ohio Knife Company, Seattle.

B. P. Jones, Westinghouse Electric and Manufacturing Company, San Francisco; Meder Johnson and G. L. Johnston, Olympic Forest Products, Port Angeles; B. L. Kerns, Westinghouse Electric and Manufacturing Company, Seattle; R. L. Kettenring, Rainier Pulp and Paper Company, Shelton; Glengarry King, Washington Pulp and Paper Company, Port Angeles; M. E. Kinsey, Rainier Pulp and Paper Company, Shelton; John O. Kjome, Scientific Supplies, Seattle; Geo. H. Krueger, Olympic Forest Products, Port Angeles; Dr. E. C. Lathrop, Crown Zellerbach Corporation, Camas; Clark Lewis, Weyerhaeuser Timber Company, Longview, Nels G. Lindh, National Paper Products, Port Townsend.

C. M. Linden, Weyerhaeuser Timber Company, Everett; W. J. Lowndes, Olympic Forest Products, Port Angeles; Paul F. Lueth, Sumner Iron Works, Everett; A. H. Lundberg, Seattle; E. Clair McCormick, Washington Pulp and Paper Corporation, Port Angeles; H. J. Metcalf, Fibreboard Products, Port Angeles; C. T. Mulledy, Olympic Forest Products, Port Angeles; Charles A. Newhall, State of Washington, Seattle; Fred Nicholson, Stetson Ross Machine Company, Seattle; E. A. Norton, Weyerhaeuser Timber Company, Everett; Joseph W. Peckham, Bristol Company, Seattle; Raymond Porter, Washington Pulp and Paper Company, Port Angeles; W. T. Pritchard, Stetson Ross Machine Company, Seattle.

Fred Radke and W. H. Rambo, Olympic Forest Products, Port Angeles; E. P. Read, Washington Pulp and Paper Corporation, Port Angeles; Edward D. Rich, Olympic Forest Products, Port Angeles; H. K. Roberts, Washington Pulp and Paper Corporation, Port Angeles; John D. Rue, Hooker Electrochemical Company, Niagara Falls, N. Y.; Rex Russell, Longview Fibre Company, Longview; Harlan Scott, Pacific Pulp and Paper Industry, Seattle; Winston Scott, Rainier Pulp and Paper Company, Shelton; James T. Sheehy, Grays Harbor Pulp and Paper Company, Hoquiam; K. Shibley, 1201 Textile Tower, Seattle; P. S. Simcoe, National Paper Products, Port Townsend; Fred R. Sievers, Crown Willamette Paper Company, Camas; Joe Sparks, Olympic Forest Products, Port Angeles.

H. A. Sprague, Olympic Forest Products Company, Port Angeles; H. E. Springer, Olympic Forest Products, Port Angeles; Philip E. Sullivan, Ingersoll Rand Company, Seattle; Robert Tabke, Rainier Pulp and Paper Company, Shelton; Earl C. Thompson, Great Western Electro-Chemical Company, Seattle; R. G. Tower, The Bristol Company, Seattle; A. L. Tickner, National Paper Products, Port Townsend; L. C. Van Arsdale and Wm. A. Veech, Olympic Forest Products, Port Angeles; J. P. Venables, Washington Pulp and Paper Company, Port Angeles; J. J. Wallitner, National Paper Products, Port Townsend; L. E. Warwick, Washington Pulp and Paper Corporation, Port Angeles; F. W. Whitney, Temple Hotel, Port Angeles; S. H. White, City of Port Angeles, Port Angeles; N. T. Widmann, Olympic Forest Products, Port Angeles.

Summer Program in Theoretical and Applied Colloid Chemistry

For five weeks beginning June 14, 1937, under the direction of Dr. E. A. Hauser, the Department of Chemical Engineering of Massachusetts Institute of Technology, Cambridge, Mass., announces a program of lectures, round-table discussions and laboratory investigations. This course is offered to anyone actively engaged in industry or in research organizations.

The course will be given five-and-a-half days a week, Mondays through Saturdays, beginning each day at 9 a. m. Lectures and round-table discussions will occupy 8 hours a week, laboratory work 30 hours, and preparation 12 hours.

The lectures will include a general but detailed survey of the fundamentals of colloid chemistry and physics with the main purpose of familiarizing the group with the basic colloid reactions, the differences and reasons of fundamental colloid reactions are compared to classical physiochemistry, and the reasons why colloid chemistry and physics are today considered as a special branch of science. Furthermore, the lectures will include a survey of the industrial applications of colloid chemistry by selecting a great variety of industries and pointing out individual problems which demonstrate the increasing importance of colloid-chemical knowledge and research in a great variety of industrial activities.

The round-table conferences and discussions will be devoted to individual specific topics in order to acquaint the group with the most recent developments in colloid chemical or physical scientific research, as well as in certain recent industrial developments.

In the laboratory it is intended to familiarize those taking the program with the methods most generally used in colloid chemistry and physics as for example, different methods of determining surface tension, sedimentation analysis, rate of coagulation, production of colloidal suspensions and emulsions, destruction of emulsions, dialysis and electrodialysis, including base exchange reactions, ultrafiltration, pH determinations in colloidal systems, flocculation-rate determinations, application of colorimetric methods in colloid chemistry, the study of monomolecular surface films, etc. A thorough training in microscopy in its relation to colloidal research will be given using the outstanding equipment available in the Institute's laboratories. Special attention is drawn to the possibility of applying the high-efficiency fluorescent-light microscopy equipment, which has already proved itself valuable in a great number of studies pertaining to surface reactions, etc.

There will also be guest speakers.

The tuition for the five weeks is $150 which includes the Summer Session Registration fee of $5. A limited number may be permitted to take the lectures without laboratory work at a tuition fee of $75. A limited number may also be permitted to take the laboratory work without the lectures if they can offer sufficient proof that they have already a satisfactory training in colloid chemistry which would warrant their doing colloid chemical research work in the laboratory.

The program will rate as seventeen credit hours for those interested in obtaining credit toward an advanced degree.

All applications and correspondence pertaining to the summer program in theoretical and applied colloid chemistry should be sent to Dr. E. A. Hauser, Massachusetts Institute of Technology, Cambridge, Mass.

Columbia Alkali Opens Cleveland Office

W. I. Galliher, director of sales, The Columbia Alkali Corporation, announces the appointment of A. E. Shaw as district sales manager of Northern Ohio with offices at 3849 Hamilton avenue, Cleveland, Ohio.

Mr. Shaw has devoted his time since he was discharged from the Army in 1919 to selling, having held several responsible positions before joining the Columbia organization in 1932. During the past few years Mr. Shaw has devoted considerable time to promotional efforts on Calcium Chloride and more recently to the distribution of Columbia's full line of products.

Panorama of Lubrication

The Shell Petroleum Corporation, of St. Louis, Mo., has just issued a series of booklets entitled "Panorama of Lubrication."

The first three copies of this series are now out. They are not of an advertising type but of an educational nature.

The various Shell sales offices and representatives have copies available for distribution to industrial, transportation and utility firms or to students. They can also arrange to have names put on their permanent mailing list to receive future issues.

Instrumentation Studies. XII

Effect of Relative Humidity on Physical Properties with Respect to the Hysteresis Effect in Changes from One Humidity to Another

By The Staff of The Institute of Paper Chemistry

It has been recognized for some time that there is a marked hysteresis in the changes in moisture content of paper accompanying the changes in the relative humidity of the air with which the paper is in contact. Jarrell (*Paper Trade J.* 85, No. 3: 47-51) reported extensive data from carefully made determinations which show that the moisture content of a paper at any relative humidity in the normal range of atmospheric conditions is much higher when the paper is brought to equilibrium in this humidity from an atmosphere of higher humidity than when brought from one of a lower humidity. The magnitude of the effect of this hysteresis on the other properties of different grades has not been adequately covered in the literature. Work done at The Institute of Paper Chemistry on the tearing strength test in connection with work for the Book Grading Committee emphasized the importance of recognizing this effect in making accurate evaluations of paper properties. Accordingly, a series of tests were made on several grades of paper covering a fairly wide range of papers.

In the work for the Book Grading Committee mentioned above, that Committee was faced with the problem of being able to accurately check tearing strength results in different laboratories. What at first appeared to be serious discrepancies were, after other possible causes had been investigated and eliminated, found to be due to the fact that the samples tested in one laboratory had been brought to the standard humidity from a higher humidity, while the samples tested in another laboratory had been brought to standard conditions from a lower humidity. To determine the approximate magnitude of this effect, two portions of each of four samples of coated paper were tested. One portion (*A*) of each sample was seasoned for two days at 65 per cent relative humidity (R.H.) and 70 deg. F. The other portion (*B*) was seasoned for the same length of time in a chamber at a relative humidity varying from 28 to 32 per cent and at a temperature of 70 deg. F. At the end of this time the humidity in the constant humidity room was brought from 65 per cent relative humidity to 50 per cent relative humidity, with the *A* group of samples in the room. When the humidity had come to equilibrium at 50 per cent, the *B* group of samples was transferred from the 30 per cent chamber to the room. The two groups of samples were seasoned for 16 hours at a constant humidity of 50 per cent and then tested. The results are shown in Table I.

TABLE I.—TEARING STRENGTH
(Grams for 16 sheets)

A = 65% R.H. down to 50% R.H.
B = 30% R.H. up to 50% R.H.

Sample No.	*A*		*B*		*A*	*B*	
	In	Across	In	Across	Ave.	Ave.	Diff.
5381	40.1	38.3	37.4	35.9	39.2	36.7	2.5
5382	49.7	42.9	49.4	40.1	46.3	44.8	1.5
5383	47.6	39.6	45.4	36.3	43.6	40.9	2.7
5384	53.6	45.2	49.8	44.2	49.4	47.0	2.4

Average Difference = 2.27

With three of these samples the average difference in tear is very uniform (2.5 grams), the fourth only showing a difference of 1.5 grams. When the results are averaged, the difference in seasoning is seen to account for a difference of approximately 5% in the results. With this data at hand, it became important to determine the magnitude of similar effects in other properties and on other grades, so that necessary precautions could be taken in general testing work.

Eighteen samples, representative of several different grades, were selected for the more extensive study. They were tested for tensile, bursting, and tearing strength, for stretch, TAPPI size, expansion, and change in basis weight. In determining basis weight, the samples were cut to the correct size at 65 per cent R.H. and the same sheet, was weighed at the various relative humidities, not taking into consideration for the calculation of basis weight any change in size at the various humidities. The change in basis weight under these conditions is directly related to the changes in moisture content.

Before starting the tests all samples were seasoned at 30 per cent R.H. This insured their being in equilibrium with a relative humidity below that of the first test. The samples were then seasoned at 40 per cent and tested, then successively seasoned and tested at 50 per cent, 65 per cent, and 75 per cent R.H. They were then seasoned at 85 per cent R.H. but not tested, following which they were successively seasoned and tested at 75, 65, 50, and 40 per cent R.H. This procedure gave results at each of four relative humidities for paper seasoned to each from a lower humidity and another set of results for paper seasoned to each relative humidity from a higher humidity. All tests were carried out at 70 ± 1 deg. F. The relative humidity during the period of seasoning and testing was held to ± 1 per cent R.H. of the humidity at which the tests were being made. The samples were seasoned for at least 12 hours at each humidity before being tested. During the whole series of tests the humidity changes were not allowed to reverse direction; that is, on the scale of increasing humidity the humidity was prevented from dropping back to a lower value before going on to the next humidity, and *vice versa* for the decreasing scale. In making the tests the standard TAPPI procedures were used and special care was taken in cutting the test specimens to see that they were all representative of the samples being tested. In the case of some samples, it was found impossible to carry out certain of the tests because of the nature of the samples.

TABLE II

Sample No.	Description
1	Supercalendered book, new sulphite and soda—60 pounds.
2	English finish book, new sulphite and soda—60 pounds.
3	Machine finish book, new sulphite and book stock—50 pounds.
4	Offset book, new sulphite and soda.
5	English finish book, ground wood sulphite.
6	100 per cent rag bond, tub sized, loft dried—22 pounds.
7	100 per cent rag ledger, tub sized, loft dried—32 pounds.
8	Index bristol, 25 per cent rag content.
9	Manifold, rag sulphite.
10	Sulphite mimeograph.
11	Sulphite bond.
12	Supercalendered waxing, raw stock
13	Sulphite glassine (high transparency).
14	Butcher wrap.
15	Butcher wrap.
16	Newsprint—32 pounds.
17	Blotting.
18	Jute tag.

Results and Discussion

A description of each sample included in the study is given in Table II. The tabulation of the values obtained for each test would give a table that would be large and very difficult to interpret; accordingly, the actual test values for one humidity only are recorded, those at 65 per cent R.H. when approached from a lower humidity (Table III). These values have been taken as a base line for calculating the percentage changes found at other relative humidities. The percentage difference, positive or negative, for each sample at each condition, from the values given in Table III, have been calculated and are given in Table IV.

Three of the samples show what is apparently an alteration in the structure of the sheets due to being subjected to high humidities. This effect is most noticeable in the TAPPI size results. The results for samples 12 (waxing), 13 (glassine), and 16 (newsprint), decrease or remain about the same during the increasing range up to 75 per cent R.H. Increasing the humidity to 85 per cent and then testing at 75 per cent, causes the test to increase markedly and through the descending scale of humidities the results are much higher than for corresponding humidities in the ascending scales, which is a reverse of the condition normally expected and found with the rest of the samples. These three samples are unsized or slightly sized and depend on the sheet structure for their resistance to water penetration. Apparently the moisture absorbed when the sheet is seasoned at high humidities irreversibly alters the sheet structure. The above condition also shows a marked effect on the bursting strength of the newsprint sample. The other two samples are not appreciably affected. There is an indication that the tensile strength and stretch of these samples are also affected.

Because of the marked difference between the TAPPI size results for the above three samples and those of the other samples, another average has been calculated, leav-

TABLE III.—TEST VALUES AT 65 PER CENT R. H. WHEN APPROACHED FROM LOWER HUMIDITIES

Sample No.	Basis Wt. (lbs.)	Bursting Strength (lbs./sq. in.)	Tensile Strength (lbs.) In	Tensile Strength (lbs.) Across	Stretch—Per cent In	Stretch—Per cent Across	Tearing Strength (g./16 sheets) In	Tearing Strength (g./16 sheets) Across	TAPPI Size (Secs.)
1	63.6(*a*)	16.6	10.4	5.6	1.88	4.75	40	39	37
2	60.4(*b*)	16.7	10.6	5.7	2.05	3.70	36	37	37
3	51.0(*b*)	9.6	7.3	4.0	1.70	4.00	33	28	6
4	72.4(*b*)	35.9	20.6	9.6	2.70	4.30	93	80	58
5	41.5(*b*)	8.8	5.4	2.8	1.55	2.55	29	24	25
6	24.6(*a*)	95.5	32.8	20.0	6.30	11.80	113	114	49
7	31.8(*a*)	82.8	32.2	16.3	6.60	12.40	162	150	57
8	91.2(*e*)	75.7	35.4	20.6	4.40	8.10	...	220	190
9	4.7(*a*)	7.5	4.8	3.0	1.80	2.40	14	12	11
10	21.0(*a*)	22.5	15.5	6.2	2.15	5.20	58	50	49
11	19.9(*a*)	34.0	20.6	9.0	2.70	6.00	53	45	52
12	16.4(*d*)	11.7	5.6	5.2	1.80	4.20	15	17	7
13	16.1(*d*)	15.9	9.7	3.8	1.70	3.30	17	14	13
14	44.8(*c*)	32.6	14.9	11.1	2.10	4.80	89	80	67
15	41.5(*c*)	39.8	15.3	11.7	2.80	4.90	74	68	57
16	32.3(*c*)	8.6	5.6	2.8	1.60	2.30	32	26	3
17	118.9(*f*)	49.3	28.0	17.7	2.30	4.70	..	294	0
18	105.4(*e*)	168.5	...	31.7	...	92.0	408	378	242

Ream Sizes

(*a*) 17 x 22—500 (*d*) 20 x 30—500
(*b*) 25 x 38—500 (*e*) 22 x 28½—500
(*c*) 24 x 36—480 (*f*) 19 x 24—500

TABLE IV.—PERCENTAGE DEVIATION FROM VALUES OBTAINED AT 65% R.H., 70° F. APPROACHED FROM LOWER HUMIDITIES

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
% Rel. Hum. at 70° F.	Book	Book	Book	Book	Book	Bond	Ledger	Index	Manifold	Mimeo	Bond	Waxing	Glassine	Butcher's	Wrap	News	Blotting	Jute Tag	Average
BASIS WEIGHT																			
40	— 2.0	— 1.7	— 1.7	+ 2.0	— 1.7	— 2.1	— 1.9	— 1.5	— 1.4	— 1.6	— 2.2	— 2.1	— 2.1	— 1.8	— 2.5	— 3.0	— 1.9	— 1.9	— 1.72
50	— 1.7	— 1.6	— 1.6	— 1.6	— 1.3	— 1.1	— 1.6	— 1.1	— 1.1	— 1.2	— 1.7	— 1.6	— 1.8	— 1.5	— 1.9	— 2.5	— 1.4	— 1.6	— 1.55
65	Taken as base line																		
75	+ 1.4	+ 1.6	+ 1.5	+ 1.7	+ 1.5	+ 1.9	+ 2.0	+ 2.3	+ 2.1	+ 2.2	+ 1.6	+ 1.6	+ 2.0	+ 2.2	+ 2.4	+ 2.4	+ 1.8	+ 2.3	+ 1.92
75	+ 2.5	+ 2.8	+ 3.0	+ 2.9	+ 3.4	+ 4.9	+ 2.8	+ 3.9	+ 3.9	+ 3.6	+ 3.4	+ 3.1	+ 3.9	+ 4.2	+ 4.3	+ 4.4	+ 3.0	+ 3.6	+ 3.53
65	+ 1.4	+ 1.5	+ 1.3	— 0.5	+ 2.1	+ 1.6	+ 1.6	+ 2.5	+ 2.5	+ 2.4	+ 1.8	+ 1.8	+ 2.0	+ 2.4	+ 2.7	+ 2.6	+ 1.5	+ 2.1	+ 1.84
50	— 0.4	— 0.4	— 0.1	— 0.6	+ 0.2	— 0.1	— 0.2	+ 0.4	+ 0.5	0.0	— 0.4	— 0.57	— 0.29	+ 0.24	— 0.13	— 0.1	— 0.2	— 0.16	— 0.13
40	— 0.6	— 0.5	— 0.4	— 0.8	+ 0.1	— 0.6	— 0.7	+ 0.1	— 0.7	— 3.3	— 0.8	— 0.7	— 0.87	— 0.21	— 0.39	— 0.6	— 0.6	— 0.57	— 0.67
BURSTING STRENGTH																			
40	+ 6.9	+ 6.1	+ 7.2	+ 3.9	+ 6.8	+ 0.96	— 3.4	+ 7.9	+ 9.2	— 1.8	+ 6.5	— 2.9	+ 3.1	— 9.4	—12.9	+ 0.54	+23.4	+17.2	+ 4.33
50	+11.5	+ 4.7	+ 5.7	+ 6.1	+ 2.3	+ 1.85	+ 1.0	+ 5.0	+ 5.2	+10.6	+ 4.9	— 4.4	+ 2.0	— 2.1	— 4.1	— 3.0	+13.3	+ 8.4	+ 3.83
65	Taken as base line																		
75	— 6.1	— 9.3	—17.5	—14.6	—17.1	— 8.33	— 3.6	— 6.2	— 1.9	— 2.2	— 5.7	— 6.1	— 2.0	— 4.5	— 3.1	—17.8	+ 9.3	— 6.0	— 6.81
75	—10.7	— 9.3	—10.8	—12.6	—14.0	—10.35	— 6.8	— 9.1	— 0.2	— 9.2	— 6.8	—10.2	— 9.3	— 8.7	— 8.5	—31.5	— 6.7	— 6.4	—10.06
65	— 4.6	— 6.1	— 7.2	— 7.6	— 4.5	— 6.1	— 2.5	— 6.2	+ 0.9	+ 6.2	+ 1.3	— 6.1	+ 0.6	— 4.6	— 8.5	—29.3	— 3.1	— 0.9	— 4.90
50	+ 3.1	+ 4.7	— 1.5	— 2.0	— 3.6	— 2.6	— 1.7	+15.3	+ 6.1	+ 1.6	+ 3.2	+14.8	+ 2.7	— 1.8	— 8.7	—42.5	+ 3.8	+ 6.2	— 0.16
40	+ 8.8	+ 7.9	+ 7.2	+ 2.0	+ 2.3	— 8.1	— 0.2	+ 2.1	+ 0.9	+ 8.9	+ 3.7	+ 3.3	+ 5.8	+ 2.9	— 6.5	—21.0	+ 7.4	+11.3	+ 2.10
TENSILE STRENGTH—IN																			
40	+23.4	+ 8.5	+ 7.3	+14.3	+ 9.4	+13.7	+ 5.7	+15.6	+ 6.1	+14.7	+ 6.7	+16.6	+15.0	+ 4.3	+16.5	+ 7.3	+16.9	.....	+11.22
50	+ 9.9	+ 2.4	+ 6.5	+ 9.4	+16.2	+ 8.8	+ 1.8	+10.6	+ 1.3	+13.9	+ 4.0	+15.5	+ 7.0	+ 7.6	+12.9	+ 8.0	+16.2	.....	+ 8.44
65	Taken as base line																		
75	—19.0	—20.1	—13.1	—18.9	—16.2	— 2.5	— 7.6	— 9.0	—11.5	—14.5	—19.0	— 0.7	— 8.4	— 6.3	— 2.5	+12.4	—13.6	.....	— 9.47
75	—10.6	—12.8	—14.1	—10.5	—12.8	— 9.8	—12.7	—15.3	—15.3	—18.5	—17.0	— 9.6	—15.6	— 7.2	+ 0.5	—10.1	—16.4	.....	—11.54
65	— 6.6	— 8.5	— 5.1	— 5.8	— 6.6	— 4.1	—10.8	— 5.7	—12.4	—13.3	— 5.9	— 2.1	— 4.8	— 9.8	+ 6.2	— 0.4	— 8.1	.....	— 5.76
50	+ 6.8	+ 9.2	+ 7.6	+ 2.6	+ 0.4	+ 7.6	— 0.3	+ 5.3	+ 5.9	+ 1.2	— 2.2	+13.8	+ 1.9	—10.0	+20.2	+ 9.1	+ 9.5	.....	+ 4.92
40	+13.5	+13 0	+10.8	+10.1	+ 4.2	+ 7.3	+ 2.3	+ 7.5	+ 0.8	+ 3.4	— 0.3	+15.5	+ 3.4	+ 7.9	+16.3	+16.8	+13.3	.....	+ 8.10
TENSILE STRENGTH—ACROSS																			
40	+14.6	+14.3	+14.7	+15.3	+13.3	+ 6.1	+ 7.5	+ 5.2	+11.3	+ 2.4	+14.6	+ 0.7	+13.0	— 2.5	+ 2.7	+ 5.4	+14.9	+ 6.6	+ 8.89
50	+11.4	+17.6	+ 8.1	+12.5	+ 7.2	+ 3.5	+12.8	+ 4.5	+13.3	+ 5.8	+ 9.1	+ 0.2	+12.0	—12.0	+ 2.7	+ 6.1	+13.0	+ 5.4	+ 7.40
65	Taken as base line																		
75	—19.9	—18.5	—19.2	—12.3	—11.9	—10.4	— 6.4	— 8.0	— 6.3	—22.5	—15.0	—10.6	— 8.3	—20.3	—11.5	—10.5	—12.9	—10.5	—13.05
75	—14.6	—11.3	—20.7	— 8.7	—14.0	—12.5	— 9.0	—14.5	—11.0	—17.5	—16.5	—15.2	—11.5	—18.4	— 3.9	—14.4	—18.8	—17.2	—13.87
65	—12.1	— 3.5	—12.1	— 7.7	— 7.2	— 4.4	— 4.8	— 8.8	— 8.7	— 6.9	—10.5	—11.1	+18.2	—12.9	— 0.5	— 6.2	—11.4	— 6.7	— 6.51
50	+ 2.9	+10.2	+ 5.7	— 6.7	+ 5.0	0.0	+ 7.2	— 2.7	+ 7.3	+10.0	+ 0.3	+ 1.0	+ 5.5	— 9.5	— 6.9	+ 2.2	+ 7.1	+ 2.0	+ 2.26
40	+ 8.4	+13.7	+10.1	+ 7.1	+10.8	+ 2.8	+ 5.3	+ 3.3	+ 9.7	+ 5.0	+ 6.7	+ 4.4	+ 8.9	—11.3	+ 3.1	+ 2.2	+ 7.7	+ 4.7	+ 5.70
STRETCH—IN																			
40	— 4.0	— 9.8	—14.7	—11.1	— 6.5	— 4.8	— 8.3	—10.2	—17.2	— 9.3	—18.9	—14.3	— 6.1	—16.7	—27.3	— 6.5	—15.7	.....	—11.20
50	— 4.0	—22.0	—14.7	—14.8	— 3.2	— 7.9	—15.2	—11.4	—11.4	— 9.3	— 9.4	— 5.7	+ 3.0	— 7.2	—18.2	0.0	— 5.9	.....	— 8.73
65	Taken as base line																		
75	+25.3	+12.2	+17.7	+ 5.6	+25.8	+12.7	+11.4	+ 6.8	+11.4	+ 7.0	+ 3.8	+ 8.6	+27.3	+21.4	— 3.6	+ 6.5	+11.8	.....	+11.76
75	+22.8	+ 7.3	+23.5	+ 5.6	+25.8	+14.3	+13.6	+11.4	+11.4	+11.6	+13.2	+ 8.6	+21.2	+31.0	+20.0	+22.6	+17.7	.....	+15.64
65	+14.7	+14.6	+23.5	+ 5.6	+32.3	+ 9.5	+ 6.1	+ 8.0	+ 5.7	+ 7.0	+16.9	+14.3	+21.2	+28.6	+14.5	+25.8	+11.8	.....	+14.40
50	+ 4.0	—12.2	+20.6	— 7.4	+ 3.2	— 0.8	— 4.6	— 5.7	— 5.7	0.0	+ 5.7	+ 8.6	+12.1	0.0	— 1.8	+ 9.7	+ 3.9	.....	+ 1.64
40	+ 6.7	— 2.4	+17.6	— 9.3	+12.9	0.0	— 9.1	— 5.7	+ 4.7	— 3.8	+11.0	+15.2	+ 9.6	— 9.1	+12.9	0.0	.....	.....	+ 2.34
STRETCH—ACROSS																			
40	—15.8	—18.9	—16.3	—33.7	—15.7	—15.7	—16.6	—17.3	—20.8	—34.0	—25.8	—33.3	—18.5	—28.4	—31.6	—15.6	— 7.5	—14.8	—21.12
50	—15.8	— 2.7	—21.3	—26.7	—21.6	—17.0	—18.2	—10.5	— 6.3	—38.8	—23.3	—15.5	— 3.8	—23.2	—17.4	— 6.7	— 9.6	— 8.2	—15.92
65	Taken as base line																		
75	+11.6	+20.3	+ 2.3	+ 2.3	+27.4	+ 7.2	+18.9	+ 9.3	+35.4	+12.6	+35.0	+15.5	+66.2	+24.2	+23.5	+15.6	+ 8.5	+40.9	+20.92
75	+ 6.3	+20.3	— 1.3	+17.4	+27.4	+14.0	+15.8	+15.4	+60.4	+ 4.0	+ 8.3	+19.1	+44.7	+ 9.5	+25.5	+15.6	+11.7	+ 9.3	+17.95
65	— 8.4	+21.6	— 5.0	+ 8.1	+ 5.9	+12.3	+14.2	+ 3.7	+27.1	+15.5	+ 8.3	+13.1	+50.8	+22.1	+15.3	+13.3	+ 3.1	+ 8.8	+12.76
50	—13.7	+ 3.8	—12.7	— 7.0	—11.8	—10.2	—15.0	+ 1.9	— 6.3	—12.6	—16.7	—11.9	+13.9	— 6.3	—15.3	—13.3	— 4.3	— 3.3	— 7.82
40	— 9.5	— 2.7	— 7.5	—16.3	—17.7	—11.4	—17.8	—16.7	—14.6	— 6.8	—19.2	—19.5	+ 6.2	— 9.5	—10.2	—17.8	—12.8	—10.4	—11.90

TABLE IV.—(CONTINUED)

Sample No. / % Rel. Hum. at 70° F.	1 Book	2 Book	3 Book	4 Book	5 Book	6 Bond	7 Ledger	8 Index	9 Manifold	10 Mimeo	11 Bond	12 Waxing	13 Glassine	14 Butcher's	15 Wrap	16 News	17 Blotting	18 Jute Tag	Average
TEARING STRENGTH—IN																			
40	—10.5	—10.0	— 4.3	—11.2	—10.9	—16.2	— 9.9	.....	—17.3	—18.7	—22.4	—19.0	—16.3	—26.8	—20.4	—17.6	.....	— 3.9	—14.15
50	— 4.0	— 2.0	0.0	—12.0	— 8.4	—14.1	— 7.5	.....	—11.5	—12.8	—44.3	—14.3	—10.5	—17.1	—19.3	—11.6	.....	— 3.2	—11.78
65	Taken as base line																		
75	— 0.5	+ 5.0	— 6.1	— 4.5	+ 0.7	+ 3.5	+ 2.5	.....	+ 5.8	+ 1.0	— 0.8	+ 4.6	+15.7	— 0.5	+17.2	— 0.3	.....	+10.6	+ 3.36
75	+ 1.1	+13.9	+ 7.3	+ 6.5	+ 6.3	+10.6	+11.6	.....	+15.8	+13.8	+ 0.8	+17.7	+39.0	— 6.3	+26.9	+ 8.4	.....	+57.5	+14.43
65	+ 1.1	+ 7.8	+ 6.1	— 1.1	+ 6.3	+ 3.2	+ 7.3	.....	+ 5.8	— 1.7	— 0.8	+15.0	+ 7.6	— 8.1	+ 1.8	+ 4.8	.....	+ 0.3	+ 3.45
50	— 2.0	+ 2.2	— 4.3	—12.0	0.0	+ 0.7	— 3.0	.....	— 5.0	— 8.3	—18.8	— 6.0	— 7.0	—17.4	— 9.2	— 2.9	.....	+ 2.9	— 5.63
40	— 2.5	+ 7.2	— 0.6	0.0	+ 1.4	— 5.3	— 1.7	.....	+ 0.7	— 4.9	— 1.5	— 6.0	— 1.7	—18.0	— 3.3	— 4.7	.....	— 3.5	— 2.77
TEARING STRENGTH—ACROSS																			
40	—18.6	— 7.7	+15.6	—15.5	—14.4	—19.0	—18.7	—33.0	—13.0	—23.3	—11.6	—21.0	—17.7	— 8.9	—24.8	—17.8	—16.9	—20.0	—15.90
50	—10.8	—10.9	— 9.9	— 3.7	—13.5	—13.4	—13.1	— 4.5	— 9.0	— 4.0	— 9.0	—16.8	—10.6	— 4.0	—11.2	—12.9	—11.7	—17.2	—10.34
65	Taken as base line																		
75	— 2.6	— 4.9	+ 2.9	+ 3.2	— 2.5	+ 1.1	+ 2.9	— 5.6	+ 8.2	+ 3.6	+ 5.4	— 1.8	+ 0.7	+11.6	+10.1	+ 8.0	—10.1	— 8.8	+ 1.10
75	— 0.5	— 3.3	+ 3.6	+ 9.5	+ 6.8	+15.2	+ 5.9	+ 7.3	+16.2	+16.0	+13.4	+15.5	+26.2	+11.6	+25.4	+14.4	— 0.8	+ 6.2	+10.47
65	— 2.6	— 4.4	+ 1.4	+ 7.2	+ 1.7	+ 1.8	+ 1.6	+ 1.8	+14.6	— 3.6	+ 2.7	+10.2	+ 6.4	+ 3.0	— 0.6	+ 4.6	— 4.4	+ 0.4	+ 2.32
50	— 6.2	+ 0.5	+ 2.8	+ 2.7	— 0.9	— 0.4	— 3.7	— 4.9	— 1.7	— 4.4	— 2.7	— 3.6	+ 0.7	— 3.5	—11.8	— 2.7	—14.2	—10.4	— 3.57
40	— 0.5	— 0.5	+ 2.8	— 1.8	— 2.8	— 3.5	— 7.5	— 8.4	0.0	— 5.6	— 8.1	— 6.6	+ 0.7	— 2.0	+ 0.6	— 3.0	—12.9	—11.2	— 3.90
TAPPI SIZE[1]																			
40	+24.0	+13.4	+ 7.8	+31.9	+10.6	+25.0	+21.0	+30.0	+19.0	+20.0	+16.0	+15.0	+41.0	+16.0	+31.0	+ 2.1	.....	+23.0	+20.40
50	+15.4	+ 5.7	+ 4.7	+16.0	+ 3.3	+18.0	+17.0	+13.0	+ 3.0	+21.0	+14.0	— 3.0	+33.0	+13.0	+10.0	+ 2.0	.....	+15.0	+11.80
65	Taken as base line																		
75	—18.3	—21.3	+12.5	—17.2	—14.7	—12.0	—10.0	—19.0	—19.0	—19.0	—30.0	—19.0	— 2.3	—19.0	—22.0	+ 9.0	.....	—29.0	—14.70
75	—27.2	—22.6	+21.9	—27.1	—15.5	—28.0	—23.0	—51.0	—22.0	—35.0	—35.0	—14.0	+15.0	—30.0	—32.0	+56.0	.....	—55.0	—19.11
65	—14.3	— 6.6	+28.2	—22.3	—25.3	—23.0	—26.0	—37.0	—22.0	—13.0	—24.0	+12.0	+24.0	—22.0	—19.0	+165.0	.....	—38.0	— 3.70
50	+ 1.4	+ 0.8	+ 1.6	— 4.8	—14.7	+ 6.0	0.0	— 9.0	+12.0	— 6.0	— 8.0	+47.0	+43.0	+ 6.0	— 4.0	+159.0	.....	— 7.0	+13.10
40	+ 9.4	+14.2	+ 6.3	+ 7.2	—20.4	+15.0	+ 1.0	— 3.0	+ 3.0	+ 3.0	+ 8.0	+53.0	+62.0	+ 2.0	+ 3.0	+206.0	.....	— 3.0	+21.50
EXPANSION—IN																			
40	— .17	— .08	.0	.0	.0	— .09	— .18	— .11	.0	.0	.0	— .1	.0	— .1	.0	— .09	.0	— .08	— .055
50	— .17	— .08	.0	.0	+ .14	— .09	— .09	— .15	.0	.0	.0	— .1	.0	— .1	.0	— .09	.0	— .08	— .045
65	Taken as base line																		
75	.0	.0	.0	+ .13	+ .25	+ .09	.0	.0	.0	.0	+ .14	— .1	.0	.0	+ .09	.0	.0	.0	+ .034
75	.0	.0	.0	+ .06	.0	+ .18	+ .09	.0	.0	.0	.0	— .1	— .1	.0	.0	— .09	.0	+ .08	+ .006
65	— .08	— .09	.0	+ .06	+ .14	.0	.0	.0	.0	.0	.0	— .1	.0	.0	— .09	.0	— .08	— .013	
50	— .16	— .08	— .17	— .06	.0	— .09	— .09	— .15	— .21	— .24	.0	— .21	— .21	.1	— .09	— .18	— .10	— .08	— .123
40	— .08	— .16	— .17	— .06	— .14	— .09	— .09	— .3	— .21	— .24	.0	— .31	— .1	— .21	— .09	— .09	— .10	— .16	— .144
EXPANSION—ACROSS																			
40	— .37	— .19	— .25	— .17	— .28	— .28	— .36	.0	— .16	— .28	— .28	— .10	— .21	— .10	— .17	— .28	— .23	— .23	— .218
50	— .31	— .13	— .18	— .17	— .28	— .21	— .35	— .19	— .08	— .18	— .28	.00	— .10	— .10	— .17	— .28	— .16	— .16	— .185
65	Taken as base line																		
75	+ .19	+ .25	+ .13	+ .17	+ .09	+ .35	+ .28	+ .38	+ .16	+ .18	+ .09	+ .21	+ .21	+ .21	+ .17	+ .18	+ .08	+ .23	+ .197
75	+ .31	+ .37	+ .19	+ .17	+ .37	+ .42	+ .42	+ .38	+ .25	+ .28	+ .18	+ .31	+ .21	+ .21	+ .09	+ .18	+ .23	+ .39	+ .275
65	+ .19	+ .25	+ .06	+ .17	+ .18	+ .21	+ .21	+ .38	+ .08	+ .18	.00	+ .21	+ .10	+ .10	+ .09	+ .18	+ .16	+ .23	+ .165
50	— .06	.0	— .13	— .08	— .09	— .14	— .14	.0	— .16	— .09	— .28	— .10	— .21	— .10	— .17	— .09	— .08	— .08	— .111
50	— .06	— .06	— .19	— .16	— .09	— .21	— .21	.0	— .25	— .18	— .28	— .10	— .21	— .21	— .17	— .09	— .08	— .08	— .146

[1] Average, excluding numbers 12, 13, and 16: 40%, +20.6; 50%, +12.1; 65%, —17.7; 75%, —27.2; 75%, —19.0; 65%, —1.8; 40%, +3.3.

ing the results of these three samples out. From the results in Table IV it is seen that the differences given in Table V are obtained between samples which have been in equilibrium at 30 per cent R.H., and seasoned and tested at 65 per cent R.H., and those which have been in equilibrium at 85 per cent, then seasoned and tested at 65 per cent R.H.

Effect of Humidity on Gloss

While relative humidity is not commonly considered as having an appreciable effect on gloss, it was suspected that very high humidities might have an important effect. Accordingly, four samples of coated book, which had been received during the winter months when the outside relative humidity was low, were tested through the same succession of conditions as outlined for the other tests, using the Bausch and Lomb glossmeter. Through the increasing range no appreciable effect was noted until 65 per cent R.H. had been passed. Beyond this point the gloss was materially lowered. At 80 per cent R.H. it was approximately 10 per cent lower than at 65 per cent R.H. The effect is quite permanent in that seasoning the samples to lower humidity does not cause the gloss to increase appreciably. Taking the samples all the way back to equilibrium at 40 per cent R.H. recovered not more than 2 per cent of the 10 per cent lost between 65 and 80 per cent. Quite apparently humidities above 65 per cent cause a change in the surface structure of coated papers. The results of the tests are given graphically in Fig. 1.

Several tests of importance have not been included in this study but since the hysteresis effect noted is caused by a hysteresis in the moisture content of the paper, it can be concluded that it is necessary to take this effect into consideration for any test on which humidity has an appreciable effect. It is probably true that the hysteresis

TABLE V.—PERCENTAGE DIFFERENCE OF RESULTS WHEN SEASONED DOWN TO 65% R. H. AS COMPARED TO THOSE SEASONED UP TO 65% R. H.

Property	Maximum		Average
Basis Weight	+ 2.7		+ 1.84
Bursting Strength	—29.3		— 4.90
Tensile Strength—			
In	—13.3		— 5.76
Across	—12.1,	+18.2	— 6.51
Stretch—			
In	+32.3		+14.40
Across	+50.8		+12.76
Tearing Strength—			
In	+15.0		+ 3.45
Across	+14.6		+ 2.32
TAPPI Size	—37.0		—19.00
Expansion—			
In	+ .14		.0
Across	+ .38		+ .08

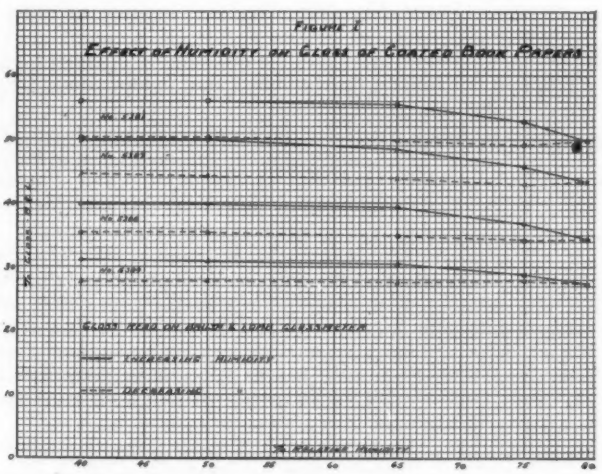

FIG. 1.

is more marked in the folding strength test than in the other strength tests, because of the greater sensitivity of this test to humidity conditions.

Conclusions

From the results of this study several general conclusions can be drawn:

1. The hysteresis effect in moisture contents accompanying changes in relative humidity of the atmosphere surrounding samples causes a hysteresis in those properties which are affected by moisture content.
2. The magnitude of the effect varies for different grades of paper.
3. The magnitude varies for different samples within the same grade.
4. The magnitude of the effect is large enough to have an important bearing on the accuracy of test results.
5. The properties of some papers are permanently changed by being subjected to high humidities (80 per cent above).
6. In general, the results obtained when testing a paper at 65 per cent R.H., approaching from lower humidities, are approximately equal to those that would be obtained when testing at 50-55 per cent R.H., approaching equilibrium from 85 per cent R.H., even when long seasoning intervals are employed.

The results obtained in this study show conclusively the necessity of taking the hysteresis effect on moisture content and consequently on property evaluation into consideration if accurate test results are desired. Accurately controlling the relative humidity of the testing room to limits of two or three per cent variation is of little use when effects equivalent to those of ten to fifteen per cent variation in relative humidity may be caused by differences in atmospheric conditions to which the paper may have been subjected prior to being placed in the testing room. The permanent effects that high humidity may have on certain grades, and the fact that natural atmospheric conditions for a greater part of the year give a relative humidity well below 65 per cent, suggest that the following procedure is the most satisfactory for use in compensating for this effect. *Where accuracy in testing is required, all samples should first be seasoned for at least two hours at 35 per cent relative humidity before being exposed to the standard condition for testing (50 to 65 per cent R.H.)*

It is felt that this period is sufficient to allow all papers to dry sufficiently so that their moisture content will be quite reproducible when they are brought to equilibrium at standard testing conditions. Such a procedure could be conveniently carried out by the use of a small cabinet, maintained at approximately 35 per cent R.H. by a tray in the bottom containing a saturated solution of $CaCl_2.6H_2O$, and equipped with a small fan to keep the air inside the cabinet in circulation. An excess of the solid calcium chloride should be maintained in the tray. The relative humidity produced will depend upon the temperature ranging from 31 per cent at 24.5 deg. C. to 35 per cent at 18.5 deg. C. For all normal ranges of room temperature this control should be sufficiently accurate.

Fundamental Research on Lithographic Papers at Bureau of Standards

Since July, 1930, the National Bureau of Standards and the Lithographic Technical Foundation, Inc., have been cooperating in a program of research on lithographic papers. The annual meeting of the Advisory Committee for this work was held at the Waldorf-Astoria, New York, February 23, to discuss the results of past research and to formulate a program for 1937-38.

Studies have been made of a number of the factors, both in manufacture and use of paper, that determine its printing quality. Four reports[1] have been published:

Research Paper No. 480, "Register Studies in Offset Lithography," by C. G. Weber and R. M. Cobb.

Research Paper No. 633, "Reactions of Lithographic Papers to Variations in Humidity and Temperature," by C. G. Weber and L. W. Snyder.

Research Paper No. 730, "Relation of Paper Properties to Register in Offset Lithography," by Charles G. Weber.

Research Paper No. 859, "Treatment of Offset Papers for Optimum Register," by Charles G. Weber and Martin N. V. Geib.

In addition to the reports, this research has resulted in the development of the Paper Hygroscope[2] and the Register Rule[3], new instruments of practical value in avoiding misregister and other paper troubles in lithography and printing.

C. G. Weber, of the Bureau of Standards, presented a report of research during the past year and a plan for future research. A study has been made of the effect of the offset printing impression and of the individual influences of moisture and ink on the dimensions of the sheet. It was found that properly conditioned, flat, paper invariably contracts slightly in the machine direction during printing. The amount of this contraction is generally negligible as far as register is concerned, and is not accounted for by any change in moisture content.

A laboratory method for determining the coefficient of moisture expansion of paper has been developed. Printing tests were completed on experimental papers made from purified wood fiber and reclaimed waste paper fibers. Studies are in progress on the effect of plasticizers on papers made from chemical wood fiber.

Preliminary tests were made to determine the rate at which piles of paper approach thermal equilibrium with the surrounding atmosphere. Completion of this study should provide valuable knowledge in the handling of paper in the pressroom, particularly paper which has become cold during shipment from the mill.

It was felt that the most important part of the future program lies in a comprehensive study of the effects of variables in fiber, fiber treatment, and structure, on the printing quality of paper.

Research on lithographic papers during 1936-37 has been made possible by voluntary contributions from ten interested firms and the generous cooperation of the National Bureau of Standards and the U. S. Coast and Geodetic Survey. The research fund is administered by the Lithographic Technical Foundation, Inc., which is enabled to support a Research Associate at the Bureau of Standards.

[1] Copies of these Bureau of Standards Research Papers are obtainable from the Superintendent of Documents, Washington, D. C., at 5 cents per copy.
[2] and [3] Information regarding these instruments may be obtained from the Lithographic Technical Foundation, Inc., 220 East 42nd street, New York.

The Use of Enzymes in the Preparation Of Paper Coatings*

Robert A. Diehm[1]

Although enzymes are as old as life itself, their nature and application have been known for little more than a generation. Practical, controlled, commercial application of enzymes is comparatively recent.

Enzymes may be defined as biological catalysts. They are chemicals produced by living organisms to carry out complex chemical reactions essential to life processes and under conditions obtaining in living things but without actually entering into the reaction or being used up by it. Enzymes are not living organisms, however. This property of accomplishing difficult chemical reactions at moderate temperatures makes enzymes of tremendous importance commercially.

An equally important feature of enzyme action is that it is specific. An enzyme which will hydrolyze starch will have no effect whatever on casein or glue. On the other hand, one which will readily solubilize casein or glue will leave starch untouched.

We still don't know just what enzymes are, chemically. The consensus of evidence seems to indicate that they consist of two parts: a colloidal carrier, which is a protein, and a specific active group attached to this carrier. The colloidal carrier is responsible for the catalytic activity, and for the stability of the active groups. These specific active groups, in turn, are responsible for the specificity of the enzyme reaction. When an enzyme acts on its substrate, the colloidal carrier is adsorbed to it; the specific groups catalyze the chemical change in the substrate; the end products are released, and finally the enzyme system is again free to be adsorbed to a second molecule of substrate. In the practical use of enzymes, however, only the system as a whole comes into consideration, and we still characterize enzymes by what they do rather than by what they are.

The types of reactions accomplished by enzymes are various; as for example, they may effect hydrolysis, oxidation, reduction, or even coagulation.

The factors influencing enzyme reactions are several, the most important being temperature, the reaction time, and the hydrogen ion concentration. Their effects are all interrelated. For example, the time for enzyme action varies inversely with the temperature and the net result is entirely dependent upon the pH at which the reaction takes place. These three factors cannot be divorced from one another because, as one changes, the others may also change. For continued and efficient use, they must be balanced so that no one, by itself, will be detrimental to the result.

Inactivation of the enzyme, when the desired reaction is completed, is important. Heating to the critical temperature of the particular enzyme in question is generally employed. A significant change in hydrogen ion concentration will frequently stop enzyme action, but there is no assurance that the enzyme itself has been inactivated. It may be dormant, so to speak. Heating to the proper temperature, on the other hand, completely distroys the enzyme.

Yet another factor influencing the reaction from the standpoint of efficiency is the concentration of the enzyme. The efficiency is not effected until a certain proportion of enzyme to substrate is reached; above that each unit of enzyme does less work. We may liken the concentration of enzyme to men digging a ditch. There is a certain amount of earth to be removed and each man can remove a definite increment per unit of time. If we have so many men to dig the ditch that they will be in each other's way, the efficiency of each man will be lowered.

The condition of the substrate plays an important part in enzyme catalysis. The ordinary diastases will not readily hydrolyze starch until it has been heated with water to a point where the starch granules gelatinize. Tryptic enzymes do not hydrolyze casein until it is put into solution on the alkaline side of neutrality. In addition to these considerations, it is necessary that these substrates are present in not too high concentrations. Tryptic and diastatic enzymes are able to effect hydrolysis only in water solution, and if the amount of free water falls below a certain minimum, their activities cease.

In passing, we might mention that the salts of heavy metals inactivate enzymes, and it is extremely important that they be eliminated from reaction mixtures. Silver, mercury and copper salts are most drastic. One part in three thousand of mercuric chloride materially injures the saccharifying action of some diastases.

The foregoing discussion has been a brief characterization of enzymes in general, their mode of reaction, the type of reactions carried out and the favorable and unfavorable influences upon their catalytic reactions. To be specific, let us proceed then to a discussion of amylolytic and protolytic enzymes which are suitable for use by the paper industry. Their use in the field is of increasing importance, and additional possibilities are being recognized daily.

Many papers are coated with clay and pigments with which an adhesive is used to bind them to the surface of the paper. For convenience of discussion the entire coating will be divided into clay, binding material, pigments, and water. In addition to these, dispersing agents, placticizers and spreading agents are used. This discussion deals with the preparation of the binding material which may consist of starch, casein or a combination of the two.

Starch in Coatings

The use of starch in coatings is very definitely on the increase. The manner in which starch is prepared for use in coating largely determines its effectiveness. It must be hydrolyzed to reduce its viscosity so that the coating material will have the proper degree of flow and the correct amount of solids. A minimum of hydrolysis should be effected to conserve as much of the adhesive strength as is possible.

The hydrolysis of starch may be considered as passing through several stages. From natural starch, the first step is the formation of "soluble starch," characterized, when tested with iodine, by a bluish violet as contrasted

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with the characteristic and intense blue given by natural starch. As hydrolysis proceeds, there are formed dextrins and maltose. Dextrins give a reddish violet color with iodine. Theoretically, there may be a definite enzyme for each stage of the hydrolysis. Practically, we recognize only liquefying and saccharifying components. The former carries the hydrolysis through "soluble starch" to the dextrin stage, while the latter produces maltose from the dextrins. The stages of hydrolysis do not proceed separately. Shortly after hydrolysis begins, all these various stages will be present. In following the hydrolytic reaction with iodine the color observed will be that of the hydrolytic product present in the greatest quantity. For instance, when the reaction mixture gives a violet color, we know that there exist soluble starch, dextrins and sugars, with the dextrins predominating.

The adhesive strength of the starch decreases as hydrolysis proceeds. In spite of this fact, we are able to change the viscosity of the coating mixture quite considerably without affecting the wax test for fiber pull after the coating has been applied. The selection of the type of enzyme for hydrolyzing is very important if maximum adhesive strength is to be obtained. If the enzyme has a strong liquefying power in comparison with the saccharifying power, then the change in viscosity has a minimum influence upon the adhesive strength. If, however, the saccharifying power exceeds that the of the liquefying, then the hydrolytic products of high adhesive strength will be rapidly converted to sugar with a distinct loss in clay binding power. Recent developments in the field of enzymology have provided methods of manufacturing enzymes with a high ratio of liquefying to saccharifying power on a commercial scale.

When the proper enzyme is used for conversion, the viscosity of starch pastes can be followed and checked conveniently by very simple equipment. The viscosity of the starch will decrease as hydrolysis proceeds. The hydrolysis should be gradual and mild, exhibiting a slow "melting away" in the conversion mixture. This not only enables one to control the conversion and to duplicate batches, but it also assures one of the proper type of hydrolysis. Practical operation has shown that a starch converted with the proper enzyme has a greater binding power for clay than starches converted with inorganic converting agents.

The conversion of starch with enzymes is a flexible process. The mill operator can often improve his products by varying not only the viscosity but also the solids content of the coating material. This can be done conveniently by varying the ratio of enzyme to starch or by changing the period of conversion. The conversion of starch in mill practice is so simple that these variations can be made without running into obstacles. The length of time used for the conversion depends upon mill conditions. The mill operator decides upon the conversion period and then uses the proper proportion of enzyme to give the desired viscosity change. For example, by allowing the enzyme to react for thirty minutes at the gelatinization point of the starch, a certain quantity of enzyme will be necessary. The same degree of hydrolysis can be obtained by increasing the amount of enzyme and reducing the time of conversion or vice versa.

The use of enzymes not only enables the coating man to produce starch coatings of the highest quality, but to do this at the lowest possible cost. The quality of starch coatings prepared with enzyme converted starches is established still more firmly by the fact that such coatings exhibit good printing qualities and stability of the starch binder.

Practical experience has shown that converted starches must meet the most rigid conditions to be used successfully in starch coatings. The use of enzymes for this purpose has been completely justified in commercial practice. Enzyme converted starches have justified their use in other processes such as tub sizing and pasting in general, by their quality and cost.

Enzymes and Casein

The other binder used in coating work is casein. Under ordinary conditions it is neither advisable nor necessary to reduce the viscosity of the casein. In discussing casein hydrolysis by means of enzymes, we shall use the following hydrolytic scheme: protein to peptone to polypeptides to peptides *to amino acids.* As in the case of starch the hydrolysis of casein may be followed conveniently by viscosity determinations. The practical handling of enzyme casein conversion is quite similar to that of the starch conversion. While the starch has to be gelatinized before hydrolysis begins, casein must be dissolved in mild alkali to prepare it for enzyme hydrolysis. It is true that hydrolysis of casein by any method reduces its adhesive strength, but enzyme hydrolysis of casein in coatings can be employed to raise the percentage of solids, keeping the viscosity and fluidity of the coating mixture the same. If the increase in solids is not too great, a very mild hydrolysis to a mixture of peptone and polypeptides may be employed. Each unit of casein will have less adhesive strength but there will be more units to give the proper degree of binding. The chief value in raising the solids of the coating mixture is to obtain quicker drying coatings.

In a different type of casein coating, however, the adhesive efficiency of the casein may be increased by the use of enzymes. The bulk of the casein is left in the unhydrolyzed state. With it is mixed a quantity of casein which has been completely hydrolyzed by enzymes. A mixture of this type gives a definite increase in adhesive strength as recorded by the standard waxes on fibre pull. A mixture of ninety per cent unhydrolyzed and ten per cent hydrolyzed casein shows a definite improvement in binding clay. We know that the hydrolyzed portion has very little adhesive strength. The increase in adhesive strength appears to be due to the fact that the amino acids and peptones of the hydrolyzed casein envelop the clay particles more thoroughly and allow a more intimate bond to be made between the clay and the casein.

The benefits to be derived from any process depend partly upon properly choosing the materials to be used. Irrespective of its other qualities, an enzyme must be economical to be useful. It is not the price per pound which counts in purchasing an enzyme. The price of an enzyme is determined first by its activity and secondly by its degree of purity. The commercial enzyme must of course, exhibit a high degree of stability so that results may be duplicated over a period of time without altering the manufacturing formula. The manufacturer of the enzyme must guarantee uniformity of different shipments so that variations are not introduced into plant processes by different lots of the enzyme. The enzyme must be of such type that it can be kept under control. This will insure uniform action in the plant processes. The conditions of inactivation must be definite and easy to meet because it is imperative that enzymes be completely inactivated once their duties have been performed. The enzyme process should be easy enough to manipulate that ordinary workmen can handle it. An enzyme preparation chosen by these standards and handled according to the fundamentals presented earlier in this paper will not fail the one who employs it.

Some Important Considerations in the Design of Electrical Machinery for Paper Mills*

By J. L. Rylander[1] and M. R. Lory[1]

Abstract

This paper discusses some of the electrical design problems which arise in making machines for paper mill applications. The special operating conditions encountered in paper mills which endanger the life of electrical machines are given and some of the measures taken by the designer to protect against these conditions are described. This involves some general discussion of insulation with a description of two types of insulation, the type applied to small motors and the type applied to larger motors.

Paper mill application problems are treated by giving a few illustrative examples of the application of electrical machines to typical paper mill drives. These include chippers, jordans, beaters and vacuum pumps.

In order to limit this broad subject so that it can be covered in a paper of reasonable length, this discussion will be limited to rotating electrical machinery. Furthermore, since the mechanical design of electrical machinery was well covered in a paper presented to this association a year ago, we shall confine ourselves as much as possible to electrical design.

Machines for the paper industry must be designed with characteristics suitable for the loads to which they are applied and they must also withstand the special operating conditions encountered. Close cooperation is essential between the electrical manufacturer, the paper mill machinery manufacturer and the mill operators to insure that each is familiar with the problems of the others, so that the best possible combination of motor and machine is put together to do the required job.

Protection Against Fumes and Moisture

The operating requirements for motors and generators in paper mills are somewhat different from those in other industries. Large quantities of moisture and chemical fumes are present. Machines operate twenty-four hours a day and seven days a week. Many motors are started with full voltage by means of across-the-line starters. Some applications are such that vibration exists. These features must be given special consideration in the design of electrical machinery for this service.

Wherever a motor is located so that water or other liquids may drip on it or be splashed on it, the type of frame or enclosure should be such that the liquids will not get on the windings. The dampness in the air should be all that the insulation on the windings must withstand, without imposing on it the added burden of splashed liquids. Splashed liquids may bring into contact parts of the winding that are otherwise well insulated from each other by ample air space or creepage surface. Splashed liquids on a winding may collect in a pocket or recess, and with long contact with the insulation, will permeate it, even though it is protected by varnish. Therefore, a protected type of machine should be used in many locations. Drip-proof, splash-proof and totally-enclosed, fan-cooled types are especially common in ratings up to about 200 h.p. Figs. 1 to 6 show typical protected motors. The choice of type of motor is dictated by the severity of the operating conditions at the point at which it will be located. Since protected machines cost more than open machines, it is poor economy to use the protected types where they are not needed, especially in the larger sizes.

The smaller a.c. motors, such as those up to approximately 50 h.p., are usually of the semi-closed slot design. This design is chosen on account of the high performance characteristics it possesses. As these motors must operate in damp locations, it is essential that the windings be insulated with the best type of insulation. The points of greatest dielectric stress where high voltage may be impressed on the insulation are in the slots between the windings and the core, between the top and bottom coils in the slots, and between coil groups on the ends. The dielectric stress is moderate between adjacent coils in the

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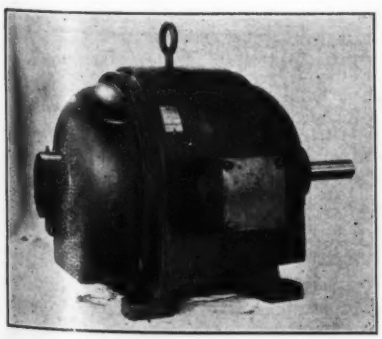

FIG. 1.

FIG. 2.

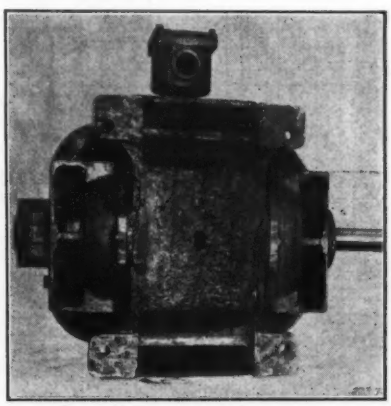

FIG. 3.

FIG. 1. Small splash-proof induction motor. FIG. 2. Frame and winding of splash-proof motor. FIG. 3. Bottom view of splash-proof motor showing arrangement of air intakes and outlets.

same group, and between turns in the same coil, but there is still an electrical stress and a magnetic force.

Moisture is always the worst enemy of insulation. Water is a conductor of electricity and its conductivity increases as dirt or chemicals are dissolved in it. In the early days of the electrical art, there was much hesitancy about using electrical machinery where water or moisture were present. The increased confidence now existing in regard to the operation of electrical machinery in damp places is a result of the increased knowledge and skill in applying materials that are highly resistant to moisture. Materials are used which absorb a minimum quantity of moisture, and absorb this small quantity at a very slow rate. This is accomplished largely by the introduction of the best grade of varnishes into the cloths and papers used as insulation. A well-built motor, with proper maintenance, gives satisfactory service and long life.

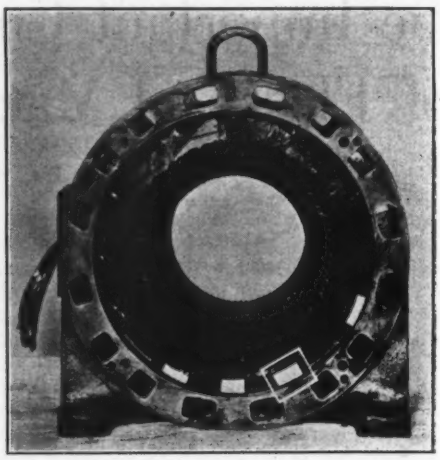

FIG. 5.
Frame of totally enclosed, fan-cooled motor. See Fig. 6 for air circulation system.

FIG. 4.
Totally enclosed, fan-cooled motor.

The following is an example of the way in which these principles are put into effect in a machine. The slots are insulated with a combination insulation which combines high dielectric strength and moisture resistance with maximum mechanical strength. It consists of a layer of varnish treated cloth cemented to the toughest paper obtainable. A piece of the same material separates the top and bottom coils in the slots and is so shaped that a wire in the bottom coil cannot slip out and touch a wire in the top coil. A piece of heavy varnish treated cloth separates the ends of the coils between which there is full phase

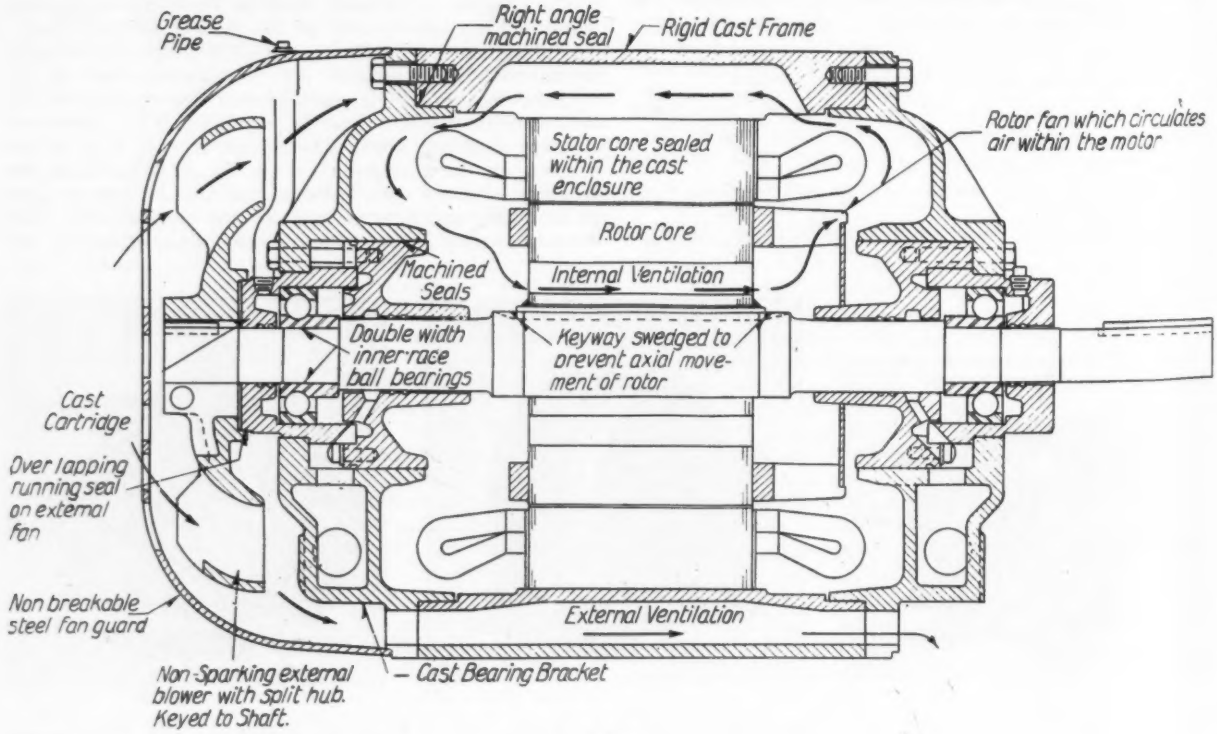
Grease Pipe
Right angle machined seal
Rigid Cast Frame
Rotor fan which circulates air within the motor
Stator core sealed within the cast enclosure
Rotor Core
Machined Seals
Internal Ventilation
Double width inner-race ball bearings
Keyway swedged to prevent axial movement of rotor
Cast Cartridge
Over lapping running seal on external fan
Non breakable steel fan guard
External Ventilation
Non-Sparking external blower with Split hub. Keyed to Shaft.
Cast Bearing Bracket

FIG. 6.
Cross-section of totally enclosed, fan cooled motor showing path of cooling air.

voltage. Each coil is taped on the ends. The individual wires are coated with several coats of baked enamel and then covered with a layer of cotton or paper. The connections are thoroughly insulated. Finally, insulation tests are applied. A 60-cycle ground test is made between the windings and the frame. This will show up any weakness in the ground insulation, but gives no indication of the strength of the insulation between coils and between turns. The latter is checked by means of a high frequency test of about the same voltage as the ground test applied between the motor terminals. This imposes a stress between turns greater than will ever be encountered in service and locates any hidden weakness in the insulation. In our company, it is the practice to apply both of these tests to all machines, and no machine is shipped which cannot pass them. Two or more coats of varnish are applied to the entire winding by immersing the complete winding in the varnish and then baking it in an oven after each immersion.

The a.c. motors of approximately 50 h.p. or larger are made with open slot cores. These are used because they permit the use of the most rugged construction of the windings in which the coils are completely formed and insulated before they are inserted in the slots. The slot portion of the coils is insulated with a mica wrapper made from several layers of mica splittings built on a thin, but strong paper base. Mica insulation is especially suitable for paper mill service since it is the best insulation for damp locations. Mica splittings have very high dielectric strength, and mica is entirely unaffected by moisture, acid or alkali fumes, or by any temperature that occurs in motor operation, and has practically unlimited life. High quality tapes are used to insulate the end portion of the coils. This type of insulation is used on the ends because they are not in contact with grounded parts and the ends also must possess a high degree of flexibility to enable the coils to be wound in the slots without injury.

The windings are securely braced to resist vibration and to permit safe starting on full line voltage. There is magnetic attraction between the conductors of each coil and between coils of the same group, and repulsion between coils of different phases. This magnetic force is proportional to the square of the current flowing in the coil. Therefore, it is twenty-five times the normal full load force at the instant of starting on a motor which has five times full load current at start. The stress on the windings increases very rapidly as the length of the coil extensions increases, and thus is highest on two, four or six pole machines. On all machines in which this force approaches a value which will distort the winding, bracing must be used. This is accomplished by tying the coils with special strong twine to well insulated steel coil supporting rings. In some cases further rigidity is obtained by putting insulating spacer between coils on the end windings so that each coil is braced by the adjacent ones and the entire end winding is arch bound. The connections are also well made and well insulated. If these precautions are not taken, the connections may break or the insulation become damaged because of vibration. The windings are treated in long life baking varnishes which resist the enemies of insulation such as moisture, dust, oil and chemicals. The windings are treated at three different stages of construction; first, after the coils are formed; second, after the coils are completely insulated; and third, after the coils have all been wound into the slots and all connections made.

Maintenance Details

It is very desirable for the electrical equipment to have long life and to be free from trouble. This can usually be accomplished with a small amount of attention and maintenance. This is especially true of bearings and windings. Bearings require very little care, if they are serviced at the proper time. The same is true of the windings, but it is more difficult to find out when the windings need care and to determine what should be done. However, this can now be done in a simple manner and with considerable assurance of dependability by using charts which show the relation between temperature and insulation resistance. The use of insulation resistance in determining the condition of insulation is not new, but some operators are not familiar with the tremendous effect that temperature has on insulation resistance. For example, if a motor winding had about 10 megohms insulation resistance at 20 deg. C., it would have about one megohm at 50 deg. C. and only 100,000 ohms at 80 deg. C. without any change in the quantity of moisture in the winding. Fig. 7 shows such a curve of insulation resistance against temperature. The highest curve is for a new machine, the middle curve is a good operating condition and the lowest curve is beyond the limit for safe operation. If the insulation resistance is measured when the winding is at a known temperature, and the point plotted on one of these charts, it will show if the motor is safe to operate and give an approximate measure of the risk involved. Some operators are willing to go closer to the limit than others, and it is possible to draw additional lines on the chart parallel to those given to suit any desired amount of margin or risk.

Machines standing idle absorb moisture quite rapidly. This is especially true of old motors in which the varnish is no longer effective. When moisture has been absorbed, the insulation may fail some time after the motor has

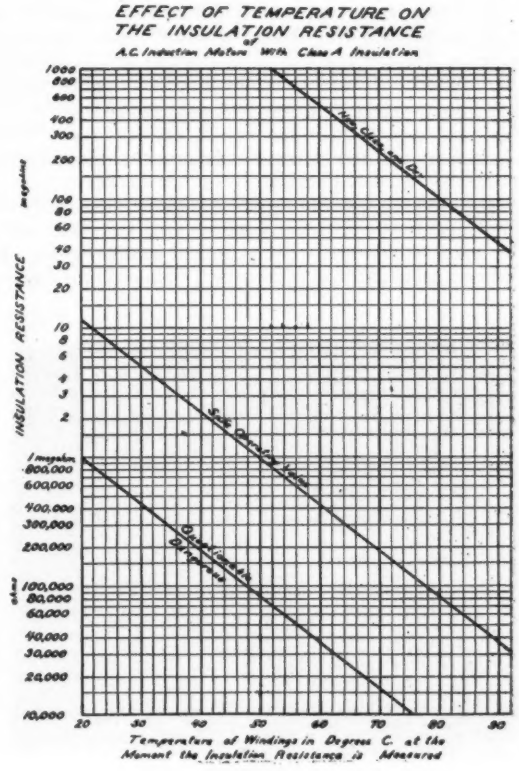

FIG. 7.
Curve of the effect of temperature on insulation resistance.

been put on the line. This is what should be expected, because, as shown on the curve, as the motor heats up, the insulation resistance goes down. If enough moisture is present, the insulation resistance goes down to a point where the insulation breaks down. Such failures can very often be prevented by testing the insulation resistance and properly interpreting it from the curve. If the measurement shows that risk is involved in running the motor, it should be dried out in a baking oven. A further improvement can be made in old windings by applying varnish treatments to them. It should be noted that windings do not absorb moisture while the motor is running under load. In fact, the heat generated will drive out some of the moisture which was absorbed while the motor stood idle in a damp atmosphere.

Particular attention must be paid to certain parts of the machine by the designer if it is to be used for practically continuous operation. Either sealed sleeve or ball bearings are used, and must be of the best possible design.

Direct current machines which operate continuously at full load for long periods must have commutators that stay put, proper machine proportions and interpole design, and well built brush rigging if commutation trouble is not to develop. Any aids to good commutation which the designer can incorporate in the machine are especially necessary on machines for paper mills. In recent years, such an aid has been used on the larger machines of approximately 200 kilowatts or larger. This is the double brush holder, which is a special holder with two narrow brushes instead of one wide one. Its use is limited to machines which ordinarily have wide brushes. The two separate brushes "ride" the commutator much more smoothly than one wide brush. Even though the commutator may be somewhat rough, one of the brushes will stay in contact with it and give good commutation. For good commutation, the commutator must be concentric and smooth and must be maintained so. Many advances have been made recently in the mechanical construction of commutators and in methods of seasoning them. The operators benefits from these improvements because maintenance is reduced.

In addition to attempting to design the electrical machines so that they will stand up under the operating conditions found in paper mills, the designer must make sure that the machines have characteristics to suit the load. In smaller sizes, machines with standard performance characteristics are usually satisfactory. General purpose motors are applied to many of the drives in paper mills. In the smaller sizes, they give good service on pumps, agitators, screens, conveyors, and all the other miscellaneous drives around the mill. Fig. 8 shows some general purpose squirrel cage motors driving flat screens. In the larger sizes it is usually more satisfactory to have the motor "tailor-made" for the particular drive. A few typical paper mill machines will be discussed to illustrate the problems which must be met in making the best application of the motor to the drive.

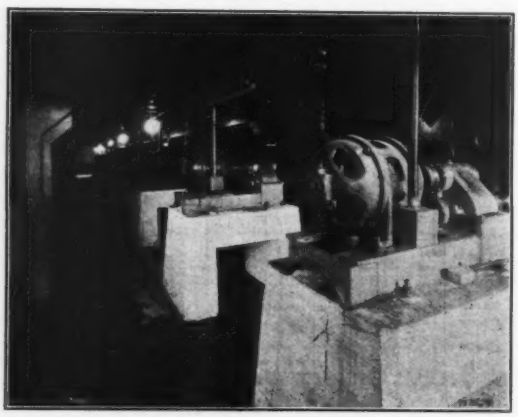

FIG. 8.

20 h.p., 1200 r.p.m. general purpose squirrel cage induction motors geared to flat screens.

Chippers

Synchronous motors are very commonly used to drive the larger machines in paper mills in order to keep the plant power factor up to the most economical value. Their use is especially widespread on chippers. The high inertia of the chipper rotor is the thing which imposes the most severe duty on synchronous motors. This type of motor acts as an induction motor during the starting period, and accelerates the load to a speed near synchronism, using the starting winding in the pole faces as a squirrel cage winding. After the load has been accelerated to the maximum speed which the motor will attain as an induction motor, the field is applied and the motor pulls into synchronism. As the field is applied, the motor must accelerate the load from the slip speed to synchronous speed in a very short time. If the inertia of the load is high, it means that the motor must be very close to synchronous speed when the field is applied, or it will not be able to accelerate this high inertia in the time available and will fail to pull in. Therefore, it is necessary that the motor have enough torque as an induction motor to bring the chipper to a speed very close to synchronism, and the chipper must be unloaded to allow the motor to attain this speed.

A second way in which the inertia affects the motor is in heating of the damper windings. It can be shown that the heat developed in the motor rotor in accelerating a load is approximately equal to the stored energy in the load when it is up to speed. Since the motor accelerates in a short time, there is not much chance for this heat to be dissipated, and it is almost all stored at the point where it is generated. Most of it is developed in the damper winding in the pole face, and consequently these windings must be sufficiently large in volume to store this large quantity of heat without reaching injurious temperatures.

In designing a motor to best suit a particular drive, it is necessary to have the proper control, so that the motor can give its best performance, and still be protected from injurious conditions. Of course, all forms of control have some means of protecting the motor from injurious overloads. In addition, most modern controls for synchronous motors have a relay which operates when the motor pulls out of synchronism for any reason, such as low voltage or loss of excitation. This relay may be connected so as to trip out the line breaker, or it may be used to remove the field and initiate a cycle similar to the starting cycle in an attempt to put the motor back on the line. The latter arrangement is called "resynchronizing" and is quite valuable when the motor characteristics and load characteristics are such that the motor is able to pull back in. However, resynchronizing has been applied to certain applications to which it is not suited, with rather bad results. It should be evident that if the motor is not able to pull the load back into step, any attempt to force it to do so is dangerous. Chippers are a good example of loads not generally suited to resynchronizing because the motors usually applied to chippers cannot pull in the high inertia of the chipper if the load is still on. It is useless

to apply resynchronizing control unless some means is provided to unload the chipper. The question may arise as to why the motor is not made with enough torque so that it can pull in under any conditions. The answer to this is that this high torque would mean a much larger motor which would be prohibitive in cost, and would have a very high value of inrush. The high inrush would impose unnecessary strains on the power system during the starting period.

Fig. 9 shows a synchronous motor applied to a chipper. Motors may be belted or direct-connected to chippers. From an electrical standpoint, the direct-connected construction has one advantage. The direct-connected motor is of lower speed and consequently larger physical size and is better able to absorb the heat during the accelerating period. The type of mounting shown in the picture has the motor overhung on an extension of the chipper shaft.

Jordans and Beaters

Synchronous motors are also very popular for jordan drives, although induction motors are also widely used. The same remarks given above in regard to resynchronizing control apply equally well to jordans, since in practically all applications using synchronous motors, the jordan plug is shifted in order to reduce the load on the motor during the starting period. The motor does not have enough torque to pull the machine back in if the motor pulls it out during normal operation. Fig. 10 shows some synchronous motors coupled to jordans.

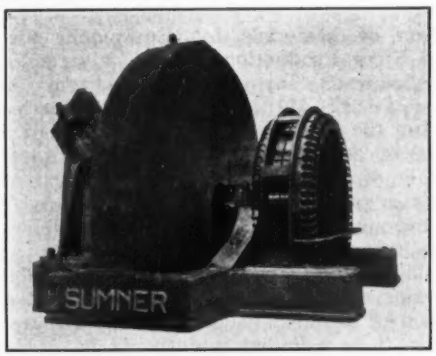

FIG. 9.
300 h.p., 277 r.p.m. synchronous motor overhung on the shaft of an 80-inch chipper.

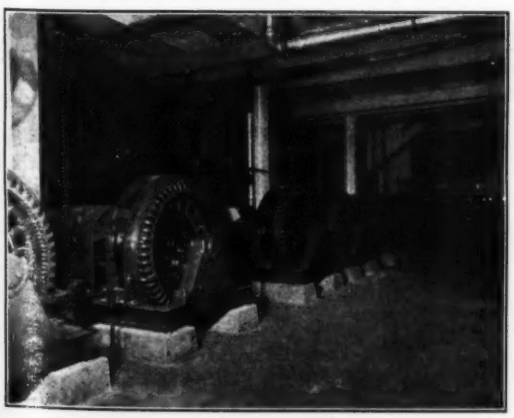

FIG. 10.
350 h.p., 360 r.p.m. synchronous motors driving jordans.

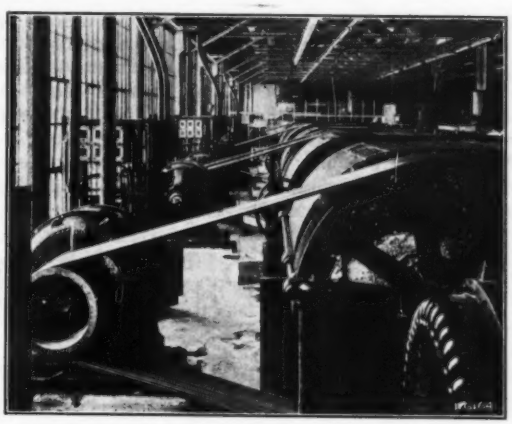

FIG. 11.
Wound rotor induction motors driving beaters through V-belt drive.

Some trouble has been experienced in the past with bearings on motors driving jordans. Certain types of jordans, especially when equipped with some types of flexible couplings, tend to impose a thrust on the motor when the plug is moved. Standard motor bearings are not designed to take any thrust, so it is the practice in our company to modify the bearings in all machines which drive jordans so that the bearings will take the small thrust loads that are encountered.

The starting torque requirements of jordans are low, and the most important characteristic is the pull-in torque. By special damper winding designs, it is possible to make a motor with low inrush and high pull-in torque. Of course, this is accomplished with a sacrifice of starting torque, but this is not serious in motors to drive jordans. The low inrush possible from these special designs may permit the motor to be started on full voltage, when the limitations of the power system would not permit this in a motor of standard design.

Beaters may be driven by either induction motors or synchronous motors. They require high starting and pull-in torques and this means that the inrush current is high when synchronous motors or squirrel-cage motors are used. If it is necessary to limit the inrush to a low value, wound-rotor induction motors are used. Fig. 11 shows such motors belted to beaters.

Vacuum Pumps

Motors are either belted or direct-connected to vacuum

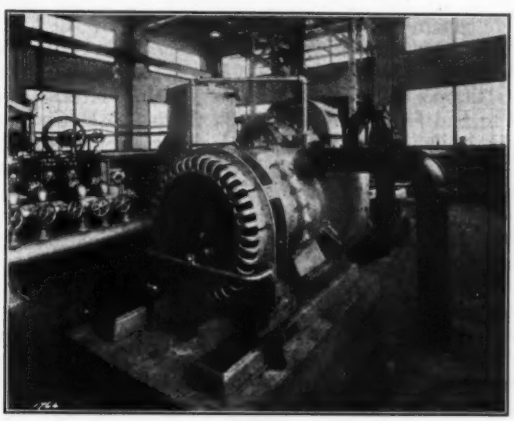

FIG. 12.
60 h.p., 360 r.p.m. synchronous motor overhung on the shaft of a vacuum pump.

pumps. Fig. 12 shows an engine type synchronous motor mounted directly on the pump shaft. This makes a very compact installation. The torque requirements are higher than standard for low speed synchronous motors, but sufficient torque is obtained by making the motor slightly larger than normal.

These are only a few of the applications for electrical machines in paper mills, but serve as typical illustrations. We have attempted to give some insight into our problems as electrical designers in making machines for the paper industry. It is impossible to tell from the name plate that a motor has the qualities which we have described as necessary for paper mill applications, such as high quality insulation, adequate bracing and good design. In fact, it is practically impossible to find these qualities by an inspection of the motor. The customer must trust to the experience and reliability of the electrical manufacturer for them.

Pulp and Paper Industry Literature Review

Abstracts of Articles and Patents Compiled by the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Machinery

Screen Plates for Paper Machines. William A. Hardy and Sons Co. Brit. pat. 446,564 (May 1, 1936).—The plate is built up of sections each of which consists of a thin slotted plate of stainless steel or other noncorrosive metal or alloys, with edges pressed over to form flanges parallel to the slots.—A.P.-C.

Mechanically Separating the Mucin from the Fibrous Material in Mechanical Wood Pulp or Other Fiber-Containing Mixture. W. Voith, H. Voith and H. Voith. Brit. pat. 447,260 (Aug. 13, 1934).—The apparatus comprises a rotary screen having imperforate portions at which zones the pulp is diluted and scrubbed by pressure-water.—A.P.-C.

Recovering Solid Matter from Paper and Pulp Mill Effluent. R. J. Venn. Brit. pat. 445,890 (Oct. 19, 1934).—After formation of a cake on a rotary filter drum from any fibrous sludge to be found about the mill, the mill effluent is filtered through the cake and continuously a substantial proportion of the cake is returned to a mixer at the feed, i.e., is added as a filter aid to the prefilt mill effluent.—A.P.-C.

The Glazing of Papers, More Particularly Glazing on One Side Only Directly on the Paper Machine. D. C. M. Papeterie 58:778-782 (Sept. 10, 1936).—A general discussion of the conditions required to obtain perfect one-side glazing on the paper machine.—A.P.-C.

Fourdrinier Paper Machine. Bernard A. Malkin. Brit. pat. 446,629 (May 4, 1936).—The table-roll section is supported as a cantilever during lateral movements to and from its operative position.—A.P.-C.

Yankee Drier Surface Repaired by Betal Spraying H. B. Rice. Paper Industry 18:464-465 (Sept., 1936).—A description of the successful metal spraying of the edges of a 12-ft. diameter Yankee drier which was badly corroded and pitted for a width of about 6 in. along the edges.—A.P.-C.

Construction Materials

New Acid-Resisting Materials for Use in the Equipment of Pulp and Paper Industry. D. M. Flyate. Bumazhnaya Prom. 15, no. 4:63-69 (1936); C. A. 30: 7333.—A review of the literature and a discussion of experiments on the acid-resisting properties and the uses of andesite, basalt, diabase, quartzite and jet in the construction of the equipment for pulp and paper industry. —C.J.W.

Selection of Materials for Equipment for Parchmentized Fiber Production. D. M. Flyate. Tzentral. Nauch.-Issledovatel. Inst. Bumazhnoi Prom. Materialui 1935, Nos. 3-4:200-239; C. A. 30:7329.—The recommendations for the use of materials, capable of resisting the corrosive action of zinc chloride solutions, in the construction of equipment for the production of parchmentized fiber paper are based on the literature, American practice and preliminary experiments. Zinc chloride solutions free from even small amounts of free acids and iron should be used. Thermosilite is highly stable to the action of zinc chloride solutions and should be used in the construction of pumps. Faolite and bakelite are equally resistant to these solutions and should be used for the surface protection of all the mechanical parts that are not exposed to shocks and friction. The use of copper should be confined to electrolytic 99.95 per cent copper for the evaporating apparatus and other equipment. Rubber and ebonite as surface protecting materials, and glazed tiles and diabase for zinc chloride baths, diffusers, etc., are satisfactory materials. For valves, plugs and other small parts, jet is an excellent material.—C.J.W.

Economics of the Use of Various Materials resistant to the Action of Zinc Chloride Solutions in the Construction of Apparatus in the Production of Parchmentized fiber. M. Ya. Marshak. Tzentral. Nauch.-Issledovatel. Inst. Bumazhnoi Prom. Materialui 1935, Nos. 3.4: 239-252.—C.J.W.

Specialties

Making Paper Bags Impervious to Water and Air by Treating the Pulp with Emulsions of Bitumens and Paraffin. V. A. Grabovskii and V. V. Yakimanskii. Tzentral. Nauch.-Issledovatel. Inst. Bumazhnoi Prom. Materialui 1935, nos. 3-4:90-124; C. A. 30:7340.—In the laboratory experiments the best results in the production and use of stable concentrated emulsions of bitumens and paraffin were obtained by the use of from 5 to 10 per cent of commercial stearin (mixtures of stearic and palmitic acids) as an emulsifying agent. Use of these emulsions decreased somewhat the mechanical properties of the resulting paper but considerably increased its impermeability to water. The imperviousness to air is lower than that of papers directly treated with bitumen emulsions stabilized with mineral oils (avtol). No particular advantages in the quality of papers were noted in treating pulp for impermeability as compared with a similar treatment of finished paper. In the commercial scale

experiments, the best results in the preparation and use of emulsions were obtained with the aid of the Hurell homogenizer. The bitumen-kaolin emulsions gave somewhat inferior results, but may prove to be practical because of their lower cost. No particular difficulties in contamination of paper-making machines were observed. —C.J.W.

Examination of Various Grades of Wood Pulp as Substitutes for Rag Waste in the Composition of Paper for the Production of Parchmentized Fiber Paper. M. F. Martuinov, A. O. Giller and F. I. Korchemkin. Tzentral. Nauch.-Issledovatel. Inst. Bumazhnoi Prom. Materialui 1935, Nos. 3-4:45-68; C. A. 30:7329.—Laboratory and factory experiments in comparative production and examination of parchmentized fiber paper and board from rag waste, sulphite and sulphate pulps and mixtures of rag waste with 25, 50 and 75 per cent of bleached and unbleached sulphite and sulphate pulps are tabulated and described. Bleached and unbleached 100 per cent sulphite pulp, with and without preliminary treatment with 0.5 and 1 per cent sodium hydroxide at 50 deg. for 2 hours, gave inferior parchmentized fiber papers. Papers containing in their composition bleached sulphate pulp showed the greatest sorptive power. Fibre paper 1 mm. thick (dry) can be prepared with pure zinc chloride solution (density, 1.96) from 100 per cent bleached sulphate pulp, 75 per cent bleached sulphate pulp and 50 and 75 per cent bleached and unbleached, refined and unrefined (sodium hydroxide) sulphite pulps. The resulting fiber papers are free from blisters and in respect to shrinkage and densities are equal to the 100 per cent rag products. The agglutination of mixed stocks in the fiber paper is inferior to those of pure rag products. The condition may be improved by the use of pure zinc chloride solutions in the parchmentization. Fiberboard 3.5 mm. thick, free from blisters and suitable for stamping, bending, etc., can be obtained from 50 per cent bleached sulphite stock with commercial zinc chloride solution. The quality parchmentized fiber paper containing in its composition wood pulp, is greatly improved by beating to optimum freeness, which is difficult.

Economics of the Production of Parchmentized Fiber Paper by Replacing Rag Waste with Wood Pulp. O. G. Ioffe. Tzentral. Nauch.-Issledovatel. Inst. Bumazhnoi Prom. Materialui 1935, Nos. 3-4:68-77.—C.J.W.

Weathering Quality of Roofing Felts Made from Various Fibers. O. G. Strieter. J. Res. Nat. Bur. Standards 16:511-523 (1936).—Roofing rags, old jute and manila bagging, old newspapers, sulphite pulp, and finely ground wood sawdust were tested as fibrous materials for asphalt roofing felts. No significant difference in the resistance of the products to weathering was detected which could be attributed to the kind of fiber or combination of fibers employed.—A.P.-C.

Paper Board. Ewen R. Smith. Can. pat. 359,360 (July 21, 1936).—Paper board is formed by sucking a layer of paper from stuff water onto a wire, couching the layer onto a flexible body, forming a further layer on the wire and couching it on the first couched layer, continuing this until the desired thickness of board is formed, and then consolidating the board by pressure.—A.P.-C.

Manufacture of Carbon Paper I. Burgmer. Brit. pat. 448,578 (April 4, 1935).—The coloring material is applied to the paper in the solid state by crushing and spreading it on the paper by means of a series of rolls. Paper of relatively low strength may be used.—A.P.-C.

Decalcomania Prints and Papers. J. Maclaurin. Brit. pat. 447,230 (June 4, 1935).—Reagents (e.g., ferric chloride + phenolphthalein) having strong identifying color reactions, but without action on the adhesive, are incorporated in the backing sheet and (or) adhesive of decalcomania paper. The identifying color is produced by subsequent addition to the paper of suitable reagents (e.g., potassium thiocyanate, caustic soda).—A.P.-C.

Production of Paraffin-Coated Paper. Rosenteil and Co. Brit. pat. 450,909 (Oct. 4, 1935).—Paraffin wax is applied to a paper web in patches of desired shape by passing it through a press, the rolls of which have correspondingly raised portions. The applying roll is of etched steel and the top roll is rubber covered.—A.P.-C.

Manufacture of Sheets or Slabs from Vegetable Fiber Pulp. H. Basler. Brit. pat. 444,490 (Sept. 20, 1934).—The pulp is introduced into a mold having a closable perforated base, which is then opened to remove most of the liquid. After a preliminary pressing in the mold, the pulp is removed to a separate apparatus and subjected to further pressure, vacuum and heat.—A.P.-C.

Parchment Paper. Laboratoire Egé and Gabriel P. Filliat. Brit. pat. 444,385 (March 19, 1936).—Unsized paper is made transparent and impervious to water, oil, etc., for use as tracing paper or as wrapping paper by treatment with sulphuric acid followed by treatment with sodium hydroxide of at least 25 deg. Bé. concentration. The treatment may be repeated if a greater degree of transparency is desired.—A.P.-C.

Manufacture of Paper. C. H. Dexter and Sons, Inc. Brit. pat. 449,118 (July 21, 1934).—Vegetable fibers, e.g., *Musa textilis*, are digested in concentrated aqueous caustic soda at not less than 100 lb. per sq. in. The fibers are separated without mechanical pressure or appreciable hydration and suspended in water at a concentration not greater than 0.025%. The stock then flows on a fourdrinier machine having its coarse (50-mesh) wire inclined upwards for a short distance from the headbox. A uniform, porous, long-fibered, absorbent paper is obtained.—A.P.-C.

Manufacture of Paper. H. Kleibaumhüter and P. Kleinbaumhüter. Brit. pat. 446,049 (July 11, 1935).—Sisal or manila fibers are loosely spun into threads which are then deposited in directions at right angles to each other, forming a very loosely woven fabric. This is incorporated in paper so that the fibers fill the interstices between the thread.—A.P.-C.

Cigarette Paper. Société Anonyme des Ancient Etablissements Braunstein Frères. Fr. pat. 798,186 (May 11, 1936).—The paper contains about 0.8% stearic acid and about 2% of a filler such as kaolin, finely divided silica, asbestos or titanium dioxide.—A.P.-C.

Treating Cellulose Fibers and Films. I. G. Farbenindustrie A.-G. Fr. pats. 797,005 and 797,049 (April 20, 1936.—*No. 797,005*—Cellulose fibers are made more resistant to rubbing by impregnating them with solutions or emulsions of wax or wax-like compounds and then with resins or their constituents for condensation. *No. 797,049*—The fibers are made more resistant to rubbing by treatment with amides or imides of acids and formaldehyde under the action of heat. Thus, cellulosic material is treated with a solution of acetamide or the amide of succinic or allophanic acid and then with vapors of formaldehyde at 120 deg. C. for 2 hours.—A.P.-C.

Felted, Proofed Cellulose Fibers. Truman A. Pascoe and Roy P. Hella. Can. pat. 359,536 (Aug. 4, 1936).—Cellulosic fibers are hydrated to form a slow stock, and felted into a dried sheet, the stock containing an amount of finely divided cellulose derivative capable of forming a sheet permeable to a volatile organic solvent for the derivative; a mixture of the solvent containing a plasticizer for the derivative is then applied so as to distend the

derivative in the sheet, and the solvent is evaporated.—A.P.-C.

Manufacture of Mixed Artificial Leather and Parchment. L. M. C. Champsaur. Brit. pat. 450,067 (Nov. 19, 1935).—Paper parchmentized on one side and absorbent on the other is obtained by parchmentizing (e.g., with sulphuric acid or zinc chloride) a paper formed of not less than two thicknesses of paper so that parchmentization extends to but a small fraction of its total thickness, followed by cleavage of the paper along a non-parchmentized plane.—A.P.-C.

Safety Paper. Aimé Azam and Aron Schwartz. Fr. pat. 799,728.—Colorless animal or vegetable cells or fibers are treated with a solution of a soluble salt so that the latter penetrates inside the membrane of the cell or fiber, where it is precipitated by treatment with an acid to give an insoluble, colorless precipitate that can give characteristic reactions with suitable reagents. The cells or fibers are incorporated into paper furnish.—A.P.-C.

Process for Improving the Glazing, Whiteness and Printability of Paper. Zschimmer und Schwarz Chemische Fabrik Dolau. Fr. pat. 799,858.—A mixture of fatty acid salts of light metals of the second group of the periodic table (free from alkali metal salts of mineral acids) and of at least one resin that is at least partially saponified is added to the furnish.—A.P.-C.

Manufacture of a Product Simulating Leather. Société des Procédés Elca. Brit. pat. 448,212 (Sept. 9, 1935).—A vulcanized article or agglomerate made with coagulated latex, or a vulcanized rubbered fabric, is treated with a solution of sulphur chloride in a cyclic or aliphatic hydrocarbon for about 20 sec., and then with water, before the sulphur chloride is evaporated or fixed on the rubber by decomposition.—A.P.-C.

Manufacture of Paper. Zschimmer & Schwarz Chemische Fabrik Dolaw. Brit. pat. 448,611 (Dec. 30, 1935).—A mixture of an alkaline-earth salt of a fatty acid and a partly saponified resin is added to the pulp. The mixture should be free from alkali-metal salts.—A.P.-C.

Hanldmake Paper: An Ancient Craft that Still Survives. Harry S. Spencer. *Paper Industry* 18:455-459 (Sept., 1936); Pulp Paper Mag. Can. 37: 563-567, 620 (Sept., 1936).—A description of the making of handmade paper as practiced at present in England.—A.P.-C.

Miscellaneous

Water for the Paper Industry. A. E. Griffin. Pulp Paper Mag. Can. 37:579-582 (Sept., 1936); Paper Trade J. 103, No. 17: 29-31 (Oct. 22, 1936).—An address discussing impurities in water, the troubles they cause in the paper industry, and the methods of overcoming or reducing them.—A.P.-C.

The Use of Glycerine in Paper Making. Georgia Leffingwell. Paper Industry 18: 463-464 (Sept., 1936).—A brief discussion of the various uses of glycerine in the manufacture of various grades of paper.—A.P.-C.

Paper Mill Slime. G. S. Douglas. Pacific Pulp Paper Ind. 10: 17-18 (June, 1936).—Mainly a survey. The various types of slime and methods of controlling it are discussed.—A.P.-C.

Treatment of Offset Papers for Optimum Register. Charles G. Weber and Martin N. V. Geib, Paper Trade J. 103, No. 12: 36-40 (Sept. 17, 1936); *see* J. Research Natl. Bur. Standards 16: 93-103 (1936).—A.P.-C.

The Colloid Mill in the Paper Industry. H. I. Bullock. Tech. Assoc. Papers 19: 328-331 (June, 1936); Paper Trade J. 103, No. 9: 30-33 (Aug. 27, 1936).—An explanation of the principle of action of the premier colloid mill, with a brief description of types of colloid mills and a discussion of colloid mill applications in the paper industry.—A.P.C.

Increasing Use of Back-Pressure Engines in European Paper Mills. C. H. S. Tupholme. Paper Trade J. 103, No. 16: 32-34 (Oct. 15, 1936).—The merits of the use of back-pressure engines for the simultaneous production of power and heat are pointed out, and a particularly interesting installation recently installed in a large paper mill and possessing several unusual features is described.—A.P.-C.

United States Patents on Paper Making. Third Quarter, 1936. Clarence J. West. Paper Trade J. 103, No. 16: 35-37 (Oct. 15, 1936).—A list in numerical sequence of patents relating to pulp and paper making issued at Washington during July, Aug. and Sept., 1936.—A.P.-C.

The Physicist and Paper Making Problems. George C. Munro. Paper Industry 18: 544-546 (Oct., 1936).—A brief discussion showing the services that the physicist can render in solving paper making problems.—A.P.-C.

Paper of Great Strength. M. D. Dmitriev. Russian patent 41,332 (Jan. 31, 1935); C. A. 30: 7345.—Combings of flax, cotton, cotton wool, etc., are introduced directly on the mesh of the paper-making machine.—C.J.W.

New Jeffrey Precision Weighing Machine

A new precision machine applicable to the processes of continuous weigh-feeding, proportioning and batching, called the "Waytrol," is announced by the Jeffrey Manufacturing Company, Columbus, Ohio. This machine combines these three features conducive to superaccuracy: (1) All-electric vibrating feeding; (2) a synchronous weigh-belt on a scale beam so pivoted as to receive material at the most sensitive end; (3) automatic all-electric control sensitized through a device called the Electric Brain.

On this unit feeding and weighing are physically separated processes. Furthemore, the rate of feed to the weight-belt, which travels at constant speed, is in no way dependent on the volume of material handled, but is governed directly by weight through the Electric Brain, which registers any slight unbalance of the belt, and makes instant correction by speeding up or slowing down the vibrating feeder. For dustless operation and to avoid the possibility of error caused by wind pressure, the entire unit is enclosed in steel and glass. It operates from any standard 60-cycle lighting circuit.

Waytrols are available in sizes handling a few pounds up to many tons per hour. The smallest will handle granular material weighing 100 lbs. per cu. ft. at a rate that can be varied from several pounds to a maximum of 4,000 lbs. per hour. All will weigh to within 1 per cent of absolute at least. Jeffrey Bulletin No. 644 describes the machine and its applications in detail.

New Foote Bros. Reducer

Foote Bros. Gear and Machine Corporation announce the addition of a new size to their line of Hygrade Worm Gear Speed Reducers. It is size 7 HG and has center distance of 7¼ inch with ratios of 3⅞ to 1 up to 2450 to 1. Horsepower ratings range from ½ to 27½ H.P., in single reduction and output torque ratings of 12,600 to 21,000 inch pounds in double reduction types. Single reduction horizontal, single reduction vertical and double reduction types are available.

The addition of this size to the line makes the IXL HYGRADE line cover a total range in horsepower capacities of .06 H.P. to 200 H.P. on single reduction types and corresponding capacities on double reduction types.

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING APRIL 10, 1937

CIGARETTE PAPER

American Tobacco Co., *Indep. Hall,* Bordeaux, 268 cs.; Champagne Paper Corp., *Indep. Hall,* Bordeaux, 258 cs.

WALL PAPER

———, *Europa,* Bremen, 4 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., *American Farmer,* London, 4 bls., 1 cs.

NEWSPRINT

International Paper Co., *P. T. Dodge,* St. Johns, 5463 rolls; International Paper Co., *Humberarm,* St. John's, 4757 rolls; International Paper Sales Co., *Humberarm,* St. Johns, 532 rolls; Lunham & Reeve, Inc., *Scanstates,* Hango, 420 rolls; Walker Goulard Plehn Co., *Scanstates,* Hango, 146 bls.; Jay Madden Corp., *Scanstates,* Hango, 397 rolls.

WRAPPING PAPER

Steiner Paper Corp., *Maasdam,* Rotterdam, 133 bls.

PACKING PAPER

A. J. Bullinger, *Black Gull,* Rotterdam, 11 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., *Queen Mary,* Southampton, 35 pkgs.; H. Reeve Angel & Co., Inc., *Ascania,* London, 8 cs.

DRAWING PAPER

———, *Queen Mary,* Southampton, 1 cs.

SURFACE COATED PAPER

Gevaert Co. of America, *Black Heron,* Antwerp, 22 cs.; ———, *Europa,* Bremen, 3 cs.

BASIC BOARD

———, *Maasdam,* Rotterdam, 11 rolls.

PHOTO PAPER

Medo Photo-Supply Co., *Ascania,* London, 1 cs.

COLORED PAPER

C. Asche & Co., *Black Heron,* Antwerp, 9 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Laconia,* Liverpool, 9 cs. (duplex); B. F. Drakenfeld & Co., *Laconia,* Liverpool, 1 cs. (simplex).

DECALCOMANIAS

Sellers Transportation Co., *Europa,* Bremen, 35 cs.

TISSUE PAPER

———, *Laconia,* Liverpool, 2 cs.

STRAW BOARD

Arrow Paper Products Co., *Maasdam,* Rotterdam, 24 bls.; Balfour Guthrie & Co., *Maasdam,* Rotterdam, 470 bdls.

MISCELLANEOUS PAPER

Japan Paper Co., *Dagfred,* Kobe, 165 cs.; Drytype Stencil Co., *Eidsvold,* Yokohama, 5 cs.

RAGS, BAGGINGS, ETC.

Guaranty Trust Co., *Dagfred,* Kobe, 75 bls. rags; Banco Coml Italiane Trust Co., *Dagfred,* Kobe, 110 bls. rags; Brandwein Mazur Co., *Dagfred,* Kobe, 100 bls. cotton waste; J. J. Ryan & Sons, *Dagfred,* Kobe, 100 bls. cotton waste; New England Waste Co., *Dagfred,* Kobe, 200 bls. cotton waste; E. J. Keller Co., Inc., *Dagfred,* ———, 200 bls. paper stock; The Barrett Co., *M. C. Holm,* Hamburg, 125 bls. rags; Chase National Bank, *M. C. Holm,* Hamburg, 75 bls. rags; E. J. Keller Co., Inc., *M. C Holm,* ———, 100 bls. cotton waste; Hicks Costarino Co., Inc., *Black Heron,* Antwerp, 101 bls. paper stock; E. J. Keller Co., Inc., *Black Gull,* ———, 55 bls. bagging; ———, *Black Gull,* Rotterdam,, 247 bls. rags; ———, *New York City,* Bristol, 76 bls. rags; W. R. Grace & Co., *Nagara Maru,* Shanghai, 100 bls. picker waste; D. S. Stern Corp., *Nagara Maru,* Osaka, 100 bls. cotton waste; Royal Manfg. Co., *American Importer,* Manchester, 20 bls. cotton waste; ———, *American Importer,* Manchester, 120 bls. cotton waste; ———, *American Importer,* Manchester, 141 bls. bagging; Loumar Textile By Products Co., *Sarcoxie,* Havre, 59 bls. bagging; W. Steck & Co., *Sarcoxie,* Havre, 57 bls. strings, 88 bls. rags; J. Cohen Sons Co., Inc., *Sarcoxie,* Havre, 34 bls. rags; R. Blank, *Sarcoxie,* Havre, 187 bls. rags; Royal Manfg. Co., *Sarcoxie,* Havre, 40 bls. cotton waste; ———, *Sarcoxie,* Havre, 72 bls. rags; J. F. Keene, *Sarcoxie,* Havre, 51 bls. rags; S. Birkenstein & Sons, *Sarcoxie,* Havre, 66 bls. new cuttings; Castle & Overton, Inc., *Sarcoxie,* Havre, 123 bls. rags, 38 bls. bagging; Hicks Costarino Co., Inc., *Sarcoxie,* Havre, 43 bls. new cuttings; Irving Trust Co., *Sarcoxie,* Havre, 94 bls. bagging; E. J. Keller Co., Inc., *Sarcoxie,* ———, 16 bls. rags, 120 bls. bagging; J. E. Eisenberg, *Sarcoxie,* Dunkirk, 24 bls. rags; Manufacturers Trust Co., *Sarcoxie,* Dunkirk, 32 bls. paper stock; Darmstadt Scott & Courtney, *Sarcoxie,* Dunkirk, 92 bls. bagging; Manufacturers Trust Co., *Ascania,* London, 13 bls. rags; J. Cohen Sons Co., Inc., *Ascania,* London, 40 bls. rags; O. S. Smith Sons, Co., *Wales Maru,* Shanghai, 150 bls. cotton waste; O'Brien Padawer Co., *Wales Maru,* Shanghai, 60 bls. cotton waste; Williamson Products Co., *Wales Maru,* Shanghai, 100 bls. cotton waste; Boger Cotton Products Co., *Wales Maru,* Shanghai, 150 bls. cotton waste; Hughes Fawcett Inc., *Wales Maru,* Shanghai, 42 bls. flax waste; ———, *Laconia,* Liverpool, 186 bags picker waste; J. Cohen Sons Co., Inc., *Laconia,* Liverpool, 16 bls. rags; Bank of N. Y. Trust Co., *Clara,* Trieste, 64 bls. rags; E. J. Keller Co., Inc., *Clara,* ———, 89 bls paper stock; ———, *Exhibitor,* Pireaus, 121 bls. rags, 83 bls. bagging; H. R. Leshin Co., *American Legion,* Buenos Ayres, 40 bls. rags; Banco Coml Italiane Trust Co., *P. N. Damm,* Gdynia, 64 bls. rags; Darmstadt Scott & Courtney, *P. N. Damm,* Gdynia, 188 bls. rags; S. Shapiro & Sons, *P. N. Damm,* Gdynia; 478 bls. rags; Philadelphia National Bank, *P. N. Damm,* Gdynia, 146 bls. rags;

Chase National Bank, *Extavia,* Istanbul, 140 bls. rags; Hicks Costarino Co., Inc., *Indep. Hall,* Bordeaux, 190 bls. rags; D. Benedetto, Inc., *Indep. Hall,* Bordeaux, 41 bls. rags; J. F. Keene, *Indep. Hall,* Bordeaux, 33 bls. rags; R. Blank, *Excello,* Leghorn, 95 bls. rags; ———, *Excello,* Naples, 726 bls. rags; ———, *Excello,* Palmero, 130 bls. rags; 1st National Bank of Boston, *Eidsvold,* Kobe, 250 bls. cotton waste; Royal Manfg. Co., *Eidsvold,* Kobe, 106 bls. rags; Bank of N. Y. Trust Co., *Eidsvold,* Kobe, 187 bls. rags; C. Comiter Co., *Eidsvold,* Kobe, 50 bls. rags; New England Waste Co., *Eidsvold,* Kobe, 500 bls. cotton waste; National City Bank, *Maasdam,* Rotterdam, 12 bls. bagging; Great Eastern Packing & Paperstock Corp., *Maasdam,* Rotterdam, 75 bls. bagging; D. S. Stern Corp., *Maasdam,* Rotterdam, 18 bls. scrap canvas; E. J. Keller Co., Inc., *Frete Maersk,* ———, 170 bls. bagging; E. J. Keller Co., Inc., *Frete Maersk,* ———, 100 bls. cotton waste; E. J. Keller Co., Inc., *Saturnia,* ———, 141 bls. bagging; E. J. Keller Co., Inc., *Schodack,* ———, 182 bls. bagging, 243 bls. paper stock; E. J. Keller Co., Inc., *Westernland,* ———, 104 bls. bagging; E. J. Keller Co., Inc., *Tai Yang,* ———, 100 bls. cotton waste.

GLUE STOCK, ETC.

American Express Co., *Laconia,* Liverpool, 272 bags hide cuttings; ———, *Clara,* Trieste, 200 bags hide glue.

OLD ROPE

Banco Coml Italiane Trust Co., *Ascania,* London, 66 coils; ———, *American Farmer,* London, 54 coils; Chase National Bank, *American Farmer,* London, 51 bls., 57 coils; W. Steck & Co., *Maasdam,* Rotterdam, 47 coils.

WOOD PULP

Tradesmans Natl Bank Trust Co., *M. C. Holm,* Hamburg, 500 bls. wood pulp, 115 tons; ———, *M. C. Holm,* Hamburg, 900 bls. sulphite, 152 tons; Perkins Goodwin & Co., *Dominion Halsyd,* St. George, N. B., 261½ tons wood pulp; Perkins Goodwin & Co., *Black Gull,* Rotterdam, 544 bls. wood pulp, 109 tons; Lagerloef Trading Co., *Scanstates,* Hango, 6696 bls. sulphite, 1280 tons; Lagerloef Trading Co., *Scanstates,* Hango, 1415 bls. sulphate, 242 tons; Lagerloef Trading Co., *Scanstates,* Hango, 1375 bls. mechanical pulp, 275 tons; ———, *Clara,* Trieste, 832 bls. wood pulp; Perkins Goodwin & Co., *P. N. Damm,* Gdynia, 1000 bls. wood pulp, 154 tons; Johaneson Wales & Sparre, Inc., *P. N. Damm,* Gdynia, 1500 bls. wood pulp, 150 tons; Price & Pierce, Ltd., *Norefjord,* Homelvik, 2100 bls. bleached sulphite, 354 tons; J. Andersen & Co., *Norefjord,* Homelvik, 1200 bls. sulphite,, 203 tons.

WOOD PULP BOARDS

———, *M. C. Holm,* Hamburg, 250 bls., 25 tons; Jay Madden Corp., *Scanstates,* Hango, 332 rolls, 127 tons.

BOSTON IMPORTS

WEEK ENDING APRIL 10, 1937

———, *Dagfred,* Shanghai, 200 bls. rags; Ayres W. C. Jones Co., *American Importer,* Manchester, 54 bls. cotton waste, *American Importer,* Manchester, 168 bls. cotton waste; Royal Manfg. Co., *American Importer,* Manchester, 150 bls. cotton waste; Leigh Textile Co., *American Importer,* Manchester, 36 bls. cotton waste; ———, *American Importer,* Liverpool, 100 bls. rags; Royal Manfg. Co., *Sarcoxie,* Havre, 37 bls. cotton waste; Ayres W. C. Jones Co., *Sarcoxie,* Havre, 19 bls. cotton waste; Irving Trust Co., *Sarcoxie,* Havre, 175 bls. bagging; Darmstadt Scott & Courtney, *Sarcoxie,* Dunkirk, 79 bls. flax waste; Irving Trust Co., *Sarcoxie,* Dunkirk, 82 bls. bagging; ———, *Sarcoxie,* Dunkirk, 38 bls. rags; Elliott Addressing Machine Co., *Wales Maru,* Kobe, 13 cs. paper; ———, *Clara,* Trieste, 5800 bls. wood pulp; ———, *Clara,* Trieste, 100 bags hide glue; E. J. Keller Co., Inc., *Black Falcon,* ———, 45 bls. bagging; Parsons & Whittemore, Inc., *Wasgenwald,* ———, 1375 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING APRIL 10, 1937

Chase National Bank, *Dagfred,* Kobe, 200 bls. rags; ———, *Dagfred,* Kobe, 560 bls. rags; ———, *New York City,* Bristol, 77 bls. rags, 40 coils old rope; E. J. Keller Co., Inc., *Sarcoxie,* ———, 672 bls. rags; Bank of The Manhattan Co., *Sarcoxie,* Havre, 145 bls. rags; Castle & Overton, Inc., *Sarcoxie,* Havre, 845 bls. rags; D. Benedetto, Inc., *Sarcoxie,* Havre, 237 bls. rags; R. J. Ross & Co., Inc., *Sarcoxie,* Havre, 121 bls. rags; W. F. Sherwood & Son, *Sarcoxie,* Havre, 51 bls. rags; ———, *Sarcoxie, Havre,* 156 bls. rags; ———, *Wales Maru,* Kobe, 167 bls. rags; E. J. Keller Co., Inc., *Indep. Hall,* ———, 734 bls. rags; Castle & Overton, Inc., *Indep. Hall,* Bordeaux, 214 bls. rags; D. Benedetto, Inc., *Indep. Hall,* Bordeaux, 88 bls. rags; Guaranty Trust Co., *Indep. Hall,* Bordeaux, 111 bls. rags; R. Blank, *Indep. Hall,* St. Nazaire, 147 bls. rags; G. W. Millar & Co., Inc., *Indep. Hall,* Havre, 219 bls. rags; Ore & Chemical Corp., *Indep. Hall,* Havre, 65 bls. rags; Castle & Overton, Inc., *Indep. Hall,* Havre, 476 bls. rags; ———, *Eidsvold,* Kobe, 135 bls. rags, 160 bls. cotton waste; D. Benedetto, Inc., *Eidsvold,* Kobe, 167 bls. rags; E. J. Keller Co., Inc., *Black Osprey,* ———, 682 bls. paper stock.

BALTIMORE IMPORTS

WEEK ENDING APRIL 10, 1937

S. Shapiro & Sons, *Black Heron,* Antwerp, 117 bls. bagging; Congoleum Nairn Co., *Black Heron,* Antwerp, 238 bls. rags; Castle & Overton, Inc., *Black Heron,* Rotterdam, 890 bls. wood pulp, 151 tons; Castle & Overton, Inc., *Black Gull,* Rotterdam, 325 bls. wood pulp, 65 tons; S. Shapiro & Sons, *Black Gull,* Antwerp, 26 bls. rags; ———, *Black Gull,* Antwerp, 40 bls. rags; Congoleum Nairn Co., *Indep. Hall,* Bordeaux, 477 bls. rags; Colgoleum Nairn Co., *Indep. Hall,* Havre, 45 bls. rags; Congoleum Nairn Co., *Excello,* Marseilles, 697 bls. rags; Philadelphia National Bank, *Eidsvold,* Kobe, 407 bls. rags; Price & Pierce, Ltd., *Toronto,* ———, 375 bls. bleached sulphite; Price & Pierce, Ltd., *Toronto,* ———, 1200 bls. unbleached sulphite; Parsons & Whittemore, Inc., *City of Norfolk,* ———, 2159 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING APRIL 10, 1937

Castle & Overton, Inc., *Black Heron,* Antwerp, 80 bls. bagging; N. Y. Trust Co., *Black Gull,* Antwerp, 111 bls. bagging; Royal Manfg. Co., *Black Gull,* Antwerp, 330 bls. flax waste; N. Y. Trust Co., *Indep. Hall,* Havre, 60 bls. bagging.

HOUSTON IMPORTS

WEEK ENDING APRIL 10, 1937

Darmstadt, Scott & Courtney, *Wales Maru,* Kobe, 49 bls. bagging.

GALVESTON IMPORTS

WEEK ENDING APRIL 10, 1937

Burka Bagging Co., *Wales Maru,* Kobe, 150 bls. bagging; Burka Bagging Co., *Eidsvold,* Kobe, 143 bls. bagging.

NEW ORLEANS IMPORTS

WEEK ENDING APRIL 10, 1937

Continental Bank Trust Co., *Clara,* Naples, 89 bls. rags; Brown Bros., Harriman & Co., *P. N. Damm,* Gdynia, 1050 bls. wood pulp 104 tons; E. J. Keller Co., Inc., *Arsa,* ———, 199 bls. paper stock.

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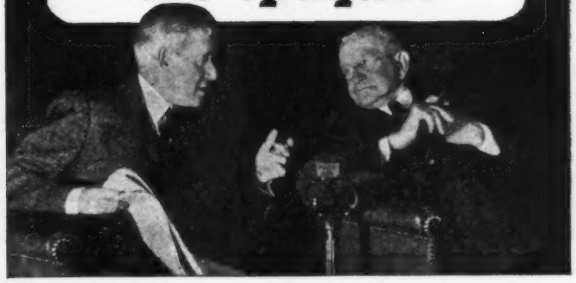

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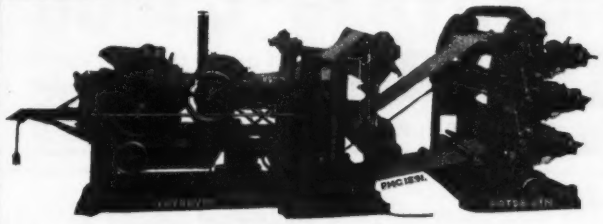

POTDEVIN

MODEL 102—HIGH SPEED

NOTION BAG MACHINE

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, April 14, 1937.

Conditions in the local paper market continue to improve. Demand for the various standard grades of paper is well sustained. Some manufacturers are having difficulty in filling orders at present and offerings are somewhat limited. Prices are holding to schedule, in most instances.

The newsprint paper market is in a better position than for some time past. Demand from the newspaper publishers is insistent. More manufacturers have followed the example of the International Paper Company in announcing an advance to $50 per ton, delivered New York, for the first six months of 1928.

Business in the fine paper market is brisk. Demand for book, cover, bond and writing papers is holding up well. Prices are steady to firm. Tissues are moving into consumption in good volume for the season. The coarse paper market is quite firm and wrapping paper is going forward freely.

Mechanical Pulp

The position of the ground wood pulp market is strong. Demand for both domestic and imported mechanical pulp is excellent. Shipments against contract are moving with regularity. Prices are holding to formerly quoted levels, without difficulty and talks of concessions are infrequent.

Chemical Pulp

Steadiness prevails in the chemical pulp market. Demand from the paper mills is brisk, while offerings continue limited, to say the least. Kraft pulp continues firm. Light and strong kraft pulp is now quoted at from $2.75 to $3.25, on dock, Atlantic ports. All other grades are steady to firm.

Old Rope and Bagging

The position of the old rope market is little changed. Paper mill demand for foreign and domestic old manila rope is satisfactory. Prices continue firm. The bagging market is moderately active. Demand from the mills is fairly persistent. Quotations on scrap and gunny bagging are generally steady.

Rags

Paper mill demand for old domestic rags is better. Due to an unexpected increase in export orders prices of cotton cuttings have advanced. Fancy shirt cuttings are now quoted at from 4.00 to 4.50; washables at from 3.00 to 3.50; mixed khaki cuttings at from 3.75 to 4.00; and O. D. khaki cuttings at from 4.50 to 4.75.

Waste Paper

The waste paper market is exhibiting a stronger undertone. Book stock prices have advanced materially. Other grades on which price increases have been announced are new box board chips, new manila cuttings, old kraft machine compressed bales and strictly overissue news. Strictly folded news and No. 1 mixed paper are strong.

Twine

Trading in the local twine market is well sustained. Demand for the various varieties is satisfactory for the time of year. Supplies are moving into consumption in good volume. Prices are holding to formerly quoted levels, without difficulty and reports of shading are infrequent.

Paper Business Active In Indiana

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., April 12, 1937 — A gradual expansion of the general paper market has been noticed in this territory during the last week. This expansion applies to nearly all items in the trade, even to mill demand for paper stock and rags. Perhaps the most encouraging feature of the business has been the increasing box demand. This is due to at least two reasons. One is a settlement of most of the automobile strikes which has caused an increase in demand for boxes from the automotive accessory field. The other is the change in seasons, which has brought an increase in demand from the hardware industry.

The coming of the spring season has stimulated demand also for all kinds of building papers. The retail outlets in the building paper field did not have much of a carryover last winter and held their stocks low during the winter months. Now they are actively in the market and predictions are that volume of all roofing and other building papers will be considerably larger in this territory than a year ago.

Some inquiries are now being received for summer specialties, but orders have not started in any volume. In spite of the calendar, spring has been deferred in this territory and actual summer specialties are not ordered until temperatures get a lot warmer than they have been here. Retail stocks are not heavy, however. Jobbers say demand for tissues continues heavy.

Fine paper is actively in demand, books, ledgers and covers all moving nicely. Container factories are making up containers for the ice cream industry, though actual orders continue light.

Print paper demand also shows expansion, orders from the small weekly papers being active. Advertising lineage is above the same period of a year ago.

Port Renfrew Pulp Chartered

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., April 12, 1937—Incorporation of the Port Renfrew Pulp and Lumber Company, Ltd., which recently established a new pulp plant at Port Renfrew, B. C., was recently announced from Victoria. The firm's registration papers show it with capitalization of $355,000 and registered offices at 531 Bastion Street, Victoria.

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Selling Agents
21 East 40th Street
New York

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KALIX TRÄINDUSTRI AKTIEBOLAG
Vanaförden, Sweden
MUNKSUNDS AKTIEBOLAG
Munksund, Sweden
NENSJÖ CELLULOSA A.-B.
Sprängsvikan, Sweden

Bleached Sulphite
KELLNER-PARTINGTON PAPER PULP CO., LTD.
Sarpsborg, Norway
Edsvalla, Sweden
Hallein & Villach, Austria

Unbleached Sulphite
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Greaker, Norway
BERGVIK OCH ALA NYA AKTIEBOLAG
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CELLULOSEFABRIKS A.-G.
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Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, April 14, 1937.

BLANC FIXE.—The blanc fixe market is moderately active. Prices are generally holding to schedule. The pulp is quoted at from $42.50 to $45 per ton, in bulk; while the powder is selling at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER.—Some improvements transpired in the bleaching powder market. Demand continues fairly persistent. The contract movement is regular. Prices are steady. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN.—The casein market is fairly active. Domestic standard ground is now quoted at 15 and finely ground at 15½ cents per pound; while Argentine standard ground is selling at 18 and finely ground at 18½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Supplies of caustic soda are moving into consumption in good volume for the season. Prices are steady. Solid caustic soda is quoted at from $2.55 to $2.60; while the flake and ground are selling at from $2.95 to $3 per 100 pounds, in drums, at works.

CHINA CLAY.—The china clay market is displaying strength. Demand from the paper mills is fairly heavy. Imported china clay is quoted at from $15 to $21 per ton, ship side; while domestic paper making clay is selling at from $6.50 to $12 per ton, at works.

CHLORINE.—Steadiness prevails in the chlorine market. Paper mill interest continues quite noticeable. The contract movement is well up to average. Prices are firm. Chlorine is quoted at from $2.15 to $2.25 per 100 pounds, in tank cars, at works.

ROSIN.—The rosin market is little changed. Paper making gum rosin is now quoted at $8.05 and wood rosin at $8.50 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $3.63 per 100 pounds, in tank cars, at works.

SALT CAKE.—Paper mill demand for salt cake is excellent. Prices continue steady. Salt cake is quoted at from $12 to $13; chrome salt cake at from $11 to $12 per ton, at works; while imported salt cake is selling at from $12 to $13 per ton, ship side.

SODA ASH.—The soda ash market is holding up well. Demand from the paper mills is fairly persistent. Prices are steady to firm. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.05; in bags, $1.20; and in barrels, $1.50.

STARCH.—Conditions in the local starch market are practically unchanged. Demand from the paper mills is fairly well sustained. Prices are steady. Special paper making starch is quoted at $4 per 100 pounds, in bags; and at $4.27 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—The sulphate of alumina market is moderately active. Contract shipments are moving freely. Commercial grades are quoted at from $1.35 to $1.60; while iron free is selling at from $2 to $2.25 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market continues steady. Yearly contracts are quoted at $18 per long ton on orders of 1,000 tons, or over, and $20 on smaller quantities. On spot and nearby car loads the quotation is $21 per ton. All quotations are in car lots, at works.

TALC.—Business in the local talc market is fairly brisk. The contract movement is normal. Prices remain steady. Domestic talc is quoted at from $15 to $18 per ton, at eastern mines; while imported talc is selling at from $23 to $30 per ton, on dock.

Market Quotations

Paper

Rag Content Bond & Ledgers—Delivered Zone 1

	Bonds		Ledgers
100% Rag Ext. No. 1	.36		.37
100% Rag	.29	@	.30
75% Rag	.22	@	.23
65% Rag	.19	@	.20
50% Rag	.15½	@	.16½
25% Rag	.13	@	.14

Sulphite Bond & Ledgers—Delivered Zone 1

	Bonds		Ledgers
No. 1 Sulphite	8.00	@	9.00
No. 2 Sulphite	7.00	@	8.00
No. 3 Sulphite	6.75	@	7.75
No. 4 Sulphite	6.50	@	7.50
Book, B Grade, Cased (f.o.b. mill less carload freight allowed)			
S. & S. C.	6.00	@	—
S. & S. C. Litho.	6.25	@	—
M. F.	5.75	@	—
No. 4 Coated and Enamel	7.00	@	—
No. 4 Coated Litho	7.00	@	—
Tissues—Per Ream—			
White No. 1	.95	@	—
White No. 1 M. G.	.92½	@	—
White No. 1½	.67½	@	—
White No. 2	.62½	@	—
Anti-Tarnish M. G.	.75	@	—
Colored	.87½	@	—
Kraft	.75	@	—
Manila	.62½	@	—
Unbleached Toilet	2.60	@	3.30
Bleached Toilet	3.94	@	5.26
Paper Towels—			
Unbleached	2.10	@	3.35
Bleached	3.30	@	3.70
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Fibre Papers—			
No 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75

(Delivered New York)

News, per ton—			
Roll, contract	42.50	@	—
Sheets	47.50	@	—
Kraft—			
No. 1 Northern	5.25	@	5.75
Standard	5.00	@	—
Southern	5.00	@	—
Glazed	4.50	@	—
Striped	4.75	@	—
Boards, per ton—			
News	47.50	@	50.00
Chip	45.00	@	47.50
Sgl. Mla. Ll. Chip	55.00	@	60.00
Jute Lined Chip	55.00	@	60.00
Kraft Liners	65.00	@	67.50
White Pat. Coated	67.50	@	70.00
Binders Boards	70.00	@	75.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	33.00	@	36.00
Dry	40.00	@	42.00

(Delivered)

No. 1 Domestic and Canadian	33.00	@	36.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.90	@	4.25
Prime Qualities—			
Easy-Bleaching Sulphite	3.50	@	3.75
Strong Unbleached Sulphite	3.40	@	3.60

(On Dock, Atlantic Ports)

Kraft Bleached	3.50	@	3.75
Kraft Light & Strong	2.75	@	3.25
Kraft No. 1	2.50	@	3.10
Kraft No. 2	2.25	@	2.50

(F.o.b. Pulp Mill)

Kraft Domestic	2.50	@	3.00

(Delivered)

Soda Bleached	2.90	@	—

Add 60 cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	9.00	@	9.25
Silesias No. 1	6.75	@	7.00
New Unbleached	9.25	@	9.50
Blue Overall	7.00	@	7.25
Fancy	4.00	@	4.50
Washables	3.00	@	3.50
Mixed Khaki Cuttings	3.75	@	4.00
O. D. Khaki Cuttings	4.50	@	4.75

Old Rags

White, No. 1—			
Repacked	3.50	@	3.75
Miscellaneous	3.00	@	3.25
White, No. 2—			
Repacked	2.50	@	2.75
Miscellaneous	2.00	@	2.25
Thirds and Blues—			
Repacked	2.00	@	2.25
Miscellaneous	1.90	@	2.00
Roofing Rags—			
No. 1	Nominal		
No. 2	1.65	@	1.75
No. 3 (bagging)	1.35	@	1.45
No. 4	1.35	@	1.45
No. 5A	1.25	@	1.35

Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.50
New Mixed Cuttings	2.00	@	2.25
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxfords	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.00
No. 2 White Linens	6.50	@	7.00
No. 3 White Linens	4.50	@	5.00
No. 4 White Linens	2.25	@	2.50
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	2.75
No. 4 White Cotton	1.90	@	2.15
Extra Light Prints	2.00	@	2.25
Ord. Light Prints	1.75	@	1.85
Med. Light Prints	1.55	@	1.65
Dutch Blue Cottons	2.25	@	2.50
French Blue Linens	3.50	@	4.00
German Blue Linens	2.50	@	2.75
German Blue Cottons	2.00	@	2.25
Checks and Blues	2.00	@	2.25
Linsey Garments	2.25	@	2.35
Dark Cottons	2.15	@	2.25
Old Shopperies	1.75	@	1.90
New Shopperies	1.75	@	2.00
French Blues	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

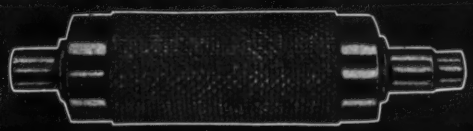
Gunny No. 1—			
Foreign	2.25	@	2.35
Domestic	2.15	@	2.25
Wool Tares, light	1.75	@	1.85
Wool Tares, heavy	2.20	@	2.35
Bright Bagging	1.70	@	1.75
Manila Rope—			
Foreign	5.00	@	5.25
Domestic	5.00	@	5.25
Jute Strings	2.75	@	3.00
Sisal Strings	2.60	@	2.75
Mixed Strings	Nominal		

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	3.20	@	3.30
Ordinary Hard White No. 1	2.50	@	2.60
Hard White No. 2	2.20	@	2.30
Soft White No. 1	2.00	@	2.10
Flat Stock—			
Stitchless	1.45	@	1.55
Over issue Mag	1.45	@	1.55
Solid Flat Book	1.35	@	1.45
Crumbled No. 1	1.05	@	1.15
Ledger Stock	1.30	@	1.35
New B. B. Chips	.65	@	.70
Manila—			
New Env. Cut	2.15	@	2.25
New Cuttings	1.80	@	2.00
Old Kraft Machine—			
Compressed bales	1.85	@	1.95
News—			
No. 1 White News	1.40	@	1.50
Strictly Overissue	.80	@	.85
Strictly Folded	.70	@	.80
No. 1 Mixed Paper	.70	@	.80

EMBOSSING ROLLERS



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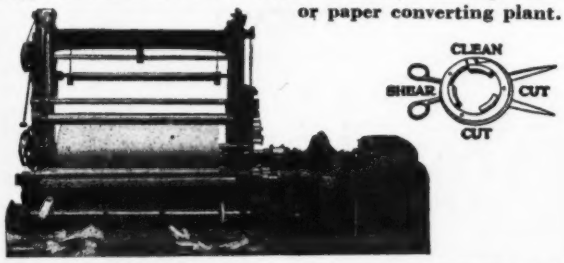

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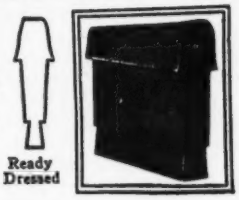

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Florence, Mass.

Twines

(F. o. b. Mill)

(Soft Fibre)

Coarse Polished—

India	.15¼	@	.17¾
Belg. White Hemp	.16¼	@	.19¾
India Compress	.15¾	@	.16¼

Fine Polished—

Fine India	.21	@	.23

Unpolished—

Box	.11¼	@	.11¾
Paper Makers	.11	@	.13
Tube Rope	.12	@	.14¾
Wall Paper	.13	@	.13¾
Wrapping	.16	@	.20
Soft Fiber Rope	.14¼	@	.14¾

(Hard Fibre)

Bond	.13½	@	.22
Anchor	.13	@	.14½
Manila	.21	@	.28

PHILADELPHIA

Paper

Rag Content Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—

	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, M.F.	5.00	@	—
Book, S. S. & C.	5.25	@	—
Book, Coated	6.75	@	—
Coated Lithograph	6.75	@	—
No. 1 Jute Manila	10.50	@	—
Manila Sul., No. 1	6.75	@	—
Manila No. 2	4.25	@	—
No. 1 Kraft	6.00	@	—
Southern Kraft	5.00	@	—
News Print Rolls	42.50	@	—
Straw Board	40.00	@	45.00
News Board	40.00	@	—
Chip Board	37.50	@	—
Wood Pulp Board	70.00	@	85.00

Binder Boards—

No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00

Tarred Felts—

Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—

New White, No. 1.	.08	@	.08½
New White, No. 2.	.04½	@	.05
Light Silesias	.05½	@	—
Silesias, No. 1	.04½	@	.05
Black Silesias, soft.	.03½	@	.04
New Unbleached	.06	@	—
Washable, No. 1	.02	@	.02½
Blue Overall	.07	@	.07¼

Cottons—According to grades—

Washable, No. 2	.02½	@	.04½
New Blue	.02	@	.02½
Fancy	.03	@	—
New Black Soft	.04	@	.04½
New Light Seconds	.03½	@	.04
New Dark Seconds	2.00	@	2.25

Khaki Cuttings—

No. 1 O. D.	.04	@	.04½
No. 2 Mixed	.03½	@	.04
Corduroy	.02	@	.02¼
New Canvas	.04	@	.04½
New Black Mixed	.02	@	.02¼

Domestic Rags (Old)

White No. 1—			
Repacked	4.00	@	4.50
Miscellaneous	3.00	@	3.50
Thirds and Blues—			
Miscellaneous	2.00	@	2.25
Repacked	2.50	@	2.75
Black Stockings (Export)	4.50	@	5.00
Roofing Stock—			
Foreign No. 1	2.20	@	2.25
Domestic No. 1	2.00	@	2.10
Domestic No. 2	1.90	@	2.00
Roofing bagging	1.75	@	—

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	2.00	@	—
Domestic	2.25	@	—
Manila Rope	4.50	@	—
Sisal Rope	3.00	@	—
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	2.25	@	2.50
No. 2	1.00	@	1.10
Wool Tares, heavy	3.25	@	3.50
Mixed Strings	1.00	@	1.10
No. 1 New Light Burlap	3.00	@	3.50
New Burlap Cuttings	2.50	@	2.75

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	—	@	2.60
No. 2 Hard White	2.20	@	2.25
No. 1 Soft White	2.00	@	2.10
No. 2 Soft White	1.75	@	—
No. 1 Mixed	—	@	.85
Solid Ledger Stock	—	@	1.75
Ledger Stock, white	1.75	@	—
Ledger Stock, colored	1.50	@	—
No. 1 Books, heavy	1.20	@	1.25
Manila Cuttings	1.80	@	1.90
Print Manila	.75	@	.85
Container Manila	.80	@	—
Kraft Paper	1.75	@	—
No. 1 Mixed Paper	.65	@	—
Straw Board Chip	.50	@	—
Binders Board Chip	.50	@	—
Corrugated Board	.70	@	.80
Overissue News	.75	@	.80
Old Newspapers	.65	@	.70

BOSTON

Paper

Rag Content Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
No. 1 Sulphite	7.65	8.65
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.25	7.25
No. 4 Sulphite	6.50	7.50

F.o.b. Mill

Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08¾
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06¼
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.05¼	@	—
No. 2 Kraft	.05	@	—

(Delivered New England points)

Southern Kraft	.05	@	—
News Print Rolls	42.00	@	—
Straw Board, rolls	42.50	@	45.00
Filled News Board	50.00	@	52.50
Chip Board	47.50	@	50.00
Single Manila Lined Chip	57.50	@	62.50
Single White, Patent Coated News Board			
(Bender)	70.00	@	77.50
Wood Pulp Board	70.00	@	75.00
Binder Boards (Standard Grade)	75.00	@	80.00

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.20	@	2.35
No. 1 Soft White	1.85	@	2.15
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.50	@	1.75
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	1.40	@	—
No. 1 Books, light	.65	@	.75
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.60	@	1.70
Manila Env. Cuttings, extra quality	2.20	@	2.30
No. 1 Old Manila	.95	@	1.00
White Blank News	1.30	@	1.40
No. 1 Kraft	2.00	@	—
Mixed Papers	.60	@	.65
Print Manila	.75	@	.85
Container Manilas	.27½	@	—
Old Newspapers	.65	@	.70
Overissue News	.50	@	.65
Box Board Chips	.40	@	.45
Transmission Rope	2.00	@	2.25
Corrugated Boxes	.95	@	1.05
Kraft corrugated boxes	1.80	@	1.85
Screening Wrappers	.60	@	.65

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	5.00	@	5.25
Domestic	3.00	@	3.30
Jute Rope	2.50	@	2.75
Soft Jute Strings	2.75	@	3.00
Jute Carpet Threads	1.75	@	2.00
Gunny No. 1—			
Foreign	2.35	@	2.50
Domestic	2.10	@	2.20
Bleachery Burlap	4.25	@	4.50
Scrap Burlap—			
Foreign	2.25	@	2.35
Domestic	2.10	@	2.20
Scrap Sisal	2.60	@	2.75
Scrap Sisal for Shredding	2.75	@	3.00
Wool Tares, heavy	2.40	@	2.60
New Burlap Cuttings	2.85	@	3.00
Aust. Wool Pouches	2.90	@	3.00
Heavy Baling Bagging	2.40	@	2.75
Paper Mill Bagging	1.75	@	1.80
Bagging No. 2	1.70	@	—

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04	@	.04¼
New White No. 1	.09	@	.09¼
New White No. 2	.06¼	@	.07
New Light Flannelettes	.07½	@	—
Silesias No. 1	.07¾	@	.08
New Black Silesias	.04¼	@	.04½
Soft Unbleached	.09½	@	.09¾
Blue Cheviot	.07½	@	.07¾
Fancy	.03¾	@	.04
Washable	.03	@	.03¼

Cottons—According to grades—

Blue Overalls	.07½	@	.07¾
New Black, soft	.04¾	@	.04½
Khaki Cuttings	.04¾	@	.05
O. D. Khaki	.05	@	.05¼
Corduroy	.03¼	@	.03½
New Canvas	.07¾	@	.08¼
B.V.D. Cuttings	.08¾	@	.09

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.75	@	2.00
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	3.90	@	4.00
Roofing Stock—			
No. 1	1.60	@	1.70
No. 2	1.50	@	1.60
No. 3	1.25	@	1.30

Foreign Rags

(F. o. b. Boston)

Dark Cottons	2.00	@	2.10
New white shirt cuttings	6.75	@	7.50
Dutch Blues	3.00	@	3.15
New Checks and Blues	2.85	@	3.00
Old Fustians	2.85	@	3.00
Old Linsey Garments	2.50	@	2.65
New Silesias	6.50	@	7.00

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.12	@	.40
Water Marked Sulphite Bond	.06¾	@	.11
Sulphite Bond	.05½	@	.07¼
Superfine Writing	.18	@	.24
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.88	@	4.25
No. 2 Kraft	3.88	@	4.25
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¼
Manila Tissue	.05¾	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—			
Rolls, contract	42.00	@	—
Sheets, open	47.00	@	—
Boards, per ton—			
Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent Coated	65.00	@	—
Container Lined—			
85 Test, per 1000 sq. ft.			1.70
100 Test, per 1000 sq. ft.			1.85

Old Papers

(F. o. b. Chicago)

Shavings—

No. 1 White Envelope Cuttings	3.30	@	3.40
No. 1 Hard White	2.60	@	2.70
No. 1 Soft White	2.10	@	2.25
Ledger & Writings	1.40	@	1.50
Solid Books	1.25	@	1.30
Blanks	1.50	@	1.65
Krafts	1.00	@	1.25
New Kraft Cuts	1.80	@	2.00
Manila Env. Cuts	2.20	@	2.35
Ex. No. 1 Manila	2.20	@	2.35
Print Manila	1.70	@	1.80
Overissue News	.80	@	.90

Old Newspapers—

No. 1 Folded News	.80	@	.90
No. 1 Mixed Paper	.80	@	.90

Roofing Stocks—

No. 1	2.00	@	2.25
No. 2	1.85	@	2.00

TORONTO

Paper

Bonds and Ledgers

Delivered

No. 1 White	.35½	@	—
No. 1 Tints	.36½	@	—
No. 2 White	.26½	@	—
No. 2 Tints	.27½	@	—
No. 4 White	.15	@	—
No. 4 Tints	.16	@	—
No. 5 Bond—White	.11	@	—
No. 5 Bond—Tints	.12	@	—
No. 5 Bond — Golden Rod	.13	@	—
No. 5 Ledger—White	.11½	@	—
No. 5 Ledger—Tints	.12	@	—
No. 6 Bond—White	.10½	@	—
No. 6 Bond—Tints	.11	@	—
No. 6 Bond—Golden Rod	.12½	@	—
No. 7 Bond—White	.08¾	@	—
No. 7 Bond—Tints	.09¼	@	—
No. 7 Bond—Golden Rod	.10¾	@	—

Book—

No. 1 M. F.	6.75	@	7.00
No. 2 M. F.	6.50	@	6.75
No. 3 M. F.	5.25	@	5.75
No. 1 S. C.	7.25	@	7.50
No. 2 S. C.	6.75	@	7.00
No. 3 S. C.	5.75	@	6.00
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	13.00	@	—

Wrapping—delivered—

Rag Brown	4.85	@	—
White Wrap	4.00	@	—
"B" Manila	4.90	@	—
No. 1 Manila	5.50	@	—
Fiber	5.50	@	—
Kraft, M. F.	6.00	@	—
Kraft, No. 2	5.50	@	—

(F. o. b. Cars Toronto)

News, per ton—			
Rolls (contract)	38.50	@	—
Sheets	45.50	@	—

Pulp

Ground wood	29.00	@	30.00
Unbleached Sulphite	52.00	@	—
Book (Class 1)	64.00	@	—
Writing (Class 2)	65.00	@	—
Select (Class 3)	66.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.25
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	1.00	@	—
Light and Crumpled Book Stock	.90	@	—
Leagers and Writings	1.10	@	—
Manilas—			
New Manila Cut	1.20	@	1.40
Printed Manilas	.55	@	—
Kraft	1.00	@	1.60
News and Scrap—			
Strictly Overissue	.65	@	—
Strictly Folded	.65	@	—
No. 1 Mixed Paper	.55	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.09	@	.09¼
Fancy Shirt Cuttings	.03¼	@	.04